ICASEE

INTERNATIONAL CONFERENCE ON APPLIED SCIENCE, ENERGY AND ENVIRONMENT 2022

ABSTRACT BOOK

March 25th - 26th 2022

Abstracts, Participants & Program

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ICASEE-2022

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6th International Conference on Applied Science, Energy and Environment

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FOREWORD

This book contains the abstracts of the 6th International Conference on Applied Science, Energy and Environment organized by the Faculty of Education, Tishk International University.

The purpose of ICASEE-2022 is to bring together researchers and practitioners interested in Applied Science, Energy and Environment to share their research findings in the field of science, alternative energy, eco-friendly energy sources, and environmental concerns.

This is to develop strategies and out plans for better involvement of science in the community and a better environment.

ICASEE2022 received 64 abstract submissions from 19 different universities and institutions. Each abstract submission was reviewed by scientific committee members of the conference.

The ICASEE-2022 has paired up with the ARO-The Scientific Journal of Koya University, which is a high-ranked journal in the region with ESCI indexed by WoS, and the Eurasian Journal of Science and Engineering (EAJSE) journal of Tishk International University regarding publications of the conference. The ARO will be publishing a limited number of the selected high-impact full-text papers. And the rest selected papers will be considered for publication in the EAJSE journal of Tishk International University.

Our mission is to make the Faculty of Education at Tishk International University a place where academicians and researchers from all over the world meet to discuss the development of their discipline and present their work.

To serve this purpose, conferences are organized along these lines of well-established and well-defined scientific disciplines. In addition,

interdisciplinary conferences are also organized because they serve the mission statement of the university.

We would like to thank all the participants, the member of organizing and scientific committees and university administrative for putting this conference together.

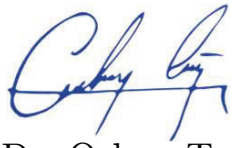

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Table of Content

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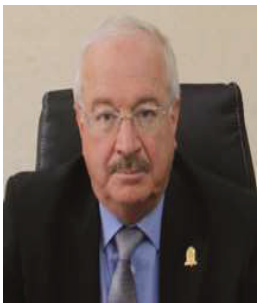
Keynote Speakers

Using Polystyrene Nano Layers as a Coating Material for Field Electron Emission



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ABSTRACT

A high emission current with relatively low operating voltage is critical for field electron emission emitters in vacuum electronic devices. This study is about using an insulator layer of Polystyrene as a coating material for Tungsten and Carbon Fiber tips in field electron emission from single field emitter experiments. The base sample tips were prepared using the electrochemical etching process and then being dipped into a solution of Polystyrene-Toluene carefully to create the coated samples.

The coated Tungsten and Carbon Fiber tips were then installed in the field emission microscope under high vacuum conditions. The current-voltage characteristics were obtained and analyzed using the Fowler-Nordheim and Murphy-Good plots. The study also includes the scanning electron microscope and the field emission microscope pattern images in order to study the changes that occur and to compare the results that obtained before and after coating process.

Using Polystyrene as a coating material show significant improvement in the current values and the threshold voltage for both Tungsten and Carbon Fiber samples.

Keywords: Field emission, composite electron sources, Polystyrene

1. Introduction

Electric-field-induced emission of electrons is a physical phenomenon that utilizes a strong electric field to lower the surface energy barrier such that electrons can tunnel into a vacuum without the assistance of thermal excitation [1, 2]. Currently, various polymeric dielectric coatings are used to improve the performance of the field electron emission (FEE) emitter, which is one of the widely used methods because it reduces the work function and thus changes the shape of the quantum barrier of the tip, reduces the emitter surface adsorption of gas atoms as well as enhances the resistance to ion bombardment [1].

Extensive works has recently been carried out to simulate this type of FEE emitters under controlled laboratory conditions by fabricating and testing composite emitters. These emitters consist of a metallic core of known microscopic profile and coated with a thin layer of dielectric material [3, 4]. The performance of these microstructures, in terms of practical parameters, was characterized as the FEE source. This showed that these coated emitters have several promising operational characteristics compared with the well – known performance of uncoated emitters [1].

2. Materials and Methods

2.1. Emitters fabrication

In this work, wire of CF-sample (with a diameter of 7 μm) and wire of W-sample (with a diameter of 0.1 mm) were used to prepare sharp nano-tip samples using the electrochemical etching process [1, 2]. Then a PS coating solution was prepared at different concentrations [5]. To coat the etched CF and W-tips with a layer of PS material to study its effect on their emissivity, they were dipped in coating solution to coat their apex with a PS thin layer [6]. This layer was stabilized and cured during the baking process of the entire field emission microscope (FEM) system, which in turn lead to drive off the solvent [1, 3].

2.2. Analytical facility

The composite-PS-coated CF and W-nano emitters were investigated in a conventional FEM under high vacuum conditions to record the emission images and the current-voltage ($I - V$) characteristics [1 – 3]. The Murphy-Good (MG) plot is a new methodology of analyzing the measured $I - V$ data; this methodology was invented based on an improved mathematical understanding of the MG-theory [6]. In this work, MG-plots were used as an enhanced methodology to analyze the obtained $I - V$ data, to more accurate emitters characterization.

3. Results and Discussion

This section presents the results obtained from CF and W emitters before and after coating with a layer of PS. These results include the $I - V$ characteristics and FEM images.

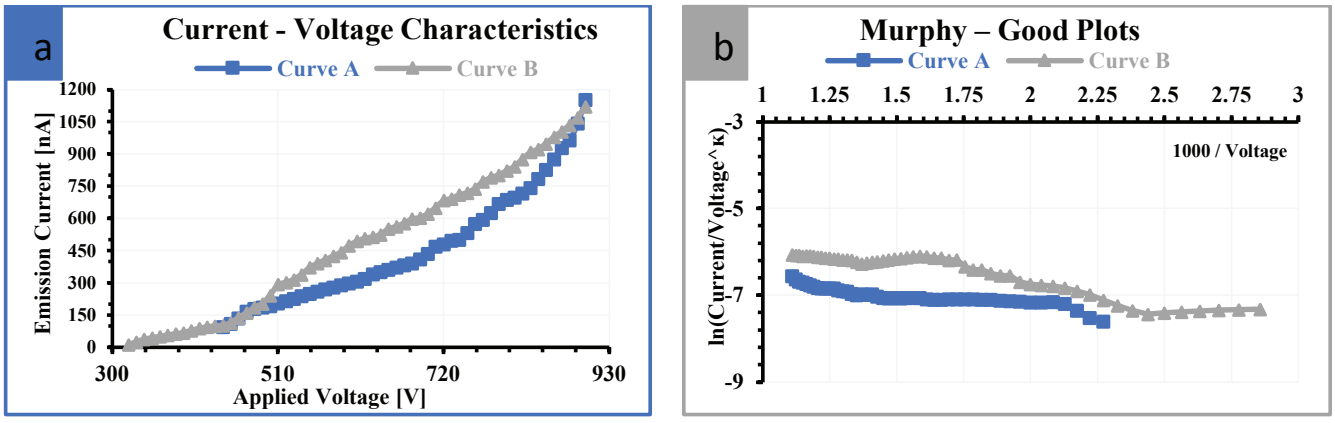

Figure 1. The $I - V$ characteristics of an uncoated CF emitter of tip radius 41.3 nm during (a) the increase (curve A) and the decrease (curve B) cycles. The MG-plots for the same emitter during (b) the increase and the decrease cycles.

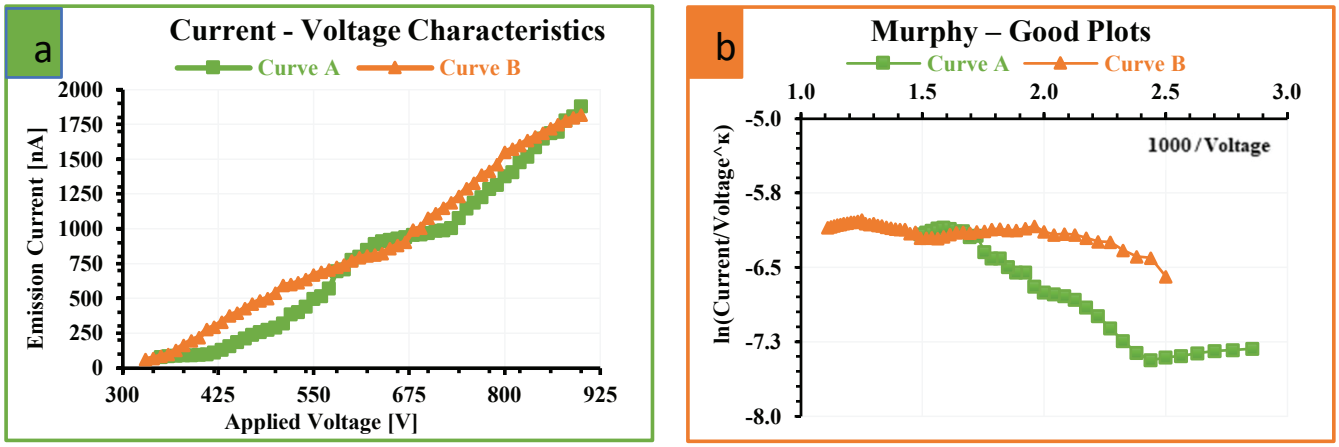

Figure 2. The $I - V$ characteristics of a CF emitter of tip radius 41.3 nm coated with a 92.5 nm thick layer of PS during (a) the increase (curve A) and the decrease (curve B) cycles. The MG-plots for the same emitter during (b) the increase and the decrease cycles.

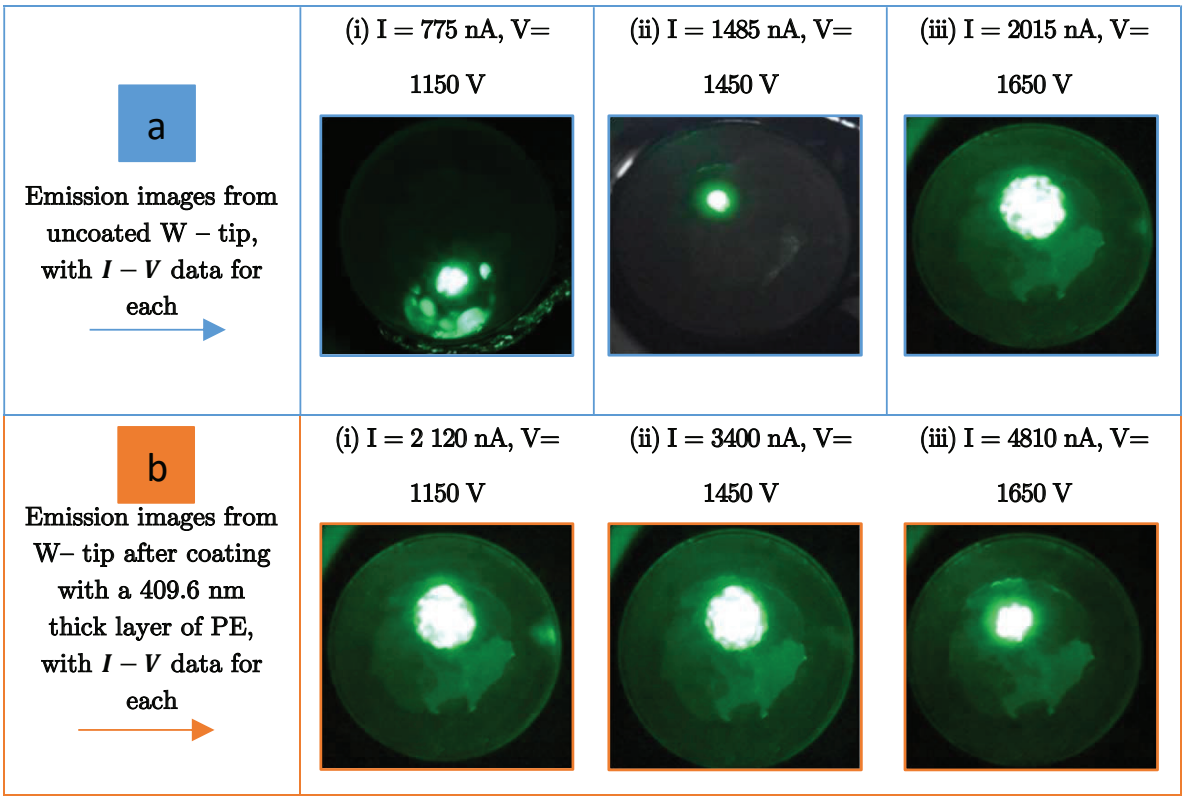

Figure 3. sequence of FEM-images produced at actual size of (a) an uncoated W emitter and after (b) coating with a 409.6 nm thick layer of PS, showing how the spot size tends to increase as the applied voltage is increased. Both sequences of images were recorded with the same tip-to-screen distance, and with the same time separation between each two consecutive images, which is 10 minutes.

4. Conclusions

It has been demonstrated that the FEE characteristics from CF and W nano point electron sources were radically changed by coating the emitter tip with a sub-micron layer of PS dielectric. Thus, it has been observed that PS-coated emitters required a lower threshold voltage than uncoated emitters. The PS-W coated emitter exhibited an initial switch-on phenomenon with a subsequent smooth and reversible $I-V$ characteristic whose threshold voltage value was a few times lower than that of the uncoated emitter, which saturates at < 1 μA. At lower current levels, a linear MG-plot was obtained with a slope value times lower than that given by the uncoated emitter. Moreover, the emission image typically was consisted of a single central image spot whose brightness was slightly higher than that produced from the uncoated emitter.

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Compact Operators on the Generalised Hahn Space

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ABSTRACT

The Hahn space was originally introduced and studied by Hahn [3] in 1922, in connection with the theory of singular integrals, and later generalised by Goes [2]. A survey of recent results on the general Hahn space can be found, for instance, in [4]. First, we recall the essential concepts and results from the theory of FK and BK spaces and the AK property, and study when the generalised Hahn space is a BK space with AK. The well-known fundamental theorem that matrix maps between BK spaces are continuous is applied to characterise various classes of bounded linear operators on the generalised Hahn space, and to determine their operator norms. We also present the axiomatic introduction of measures of noncompactness on the class of bounded subsets of complete metric spaces, and recall the definitions of the most popular ones, namely the Kuratowski and Hausdorff measures of noncompactness (cf. [6]). The most important applications of the Kuratowski measure of noncompactness are in fixed point theory and Darbo's fixed point theorem and its modifications. We present the properties of the Hausdorff measure of noncompactness in Banach spaces, needed to determine the Hausdorff measure of noncompactness of the bounded linear operators on the generalised Hahn space, and characterise the subclasses of compact operators of the previously determined classes of linear bounded operators. Finally, we present a few interesting applications of our results, some of which can be found in [5]

and [7]. The publications [1] and [8] contain several more results related to our research.

Keywords: Generalised Hahn spaces, BK and FK spaces, measures of noncompactness

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The Covid-29 Pandemic - Chance or Detriment for Ethnobiological Research and International Collaboration

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ABSTRACT

The recent and ongoing outbreak of coronavirus disease (COVID-19) is a huge global challenge. In ethnobiological research COVID-19 might be an incentive to better implement the Nagoya Protocol on Access and Benefit Sharing, and change the role of local participants and give them the role they deserve, - to not only be participants, but investigators, and co-authors [1-2]. Rather than sending (mostly) western students and researchers around the globe, COVID-19 might finally force the ethnobiology community to focus on training of local researchers, so that they can conduct interviews in their own communities, and then to fully participate in data analysis and publication. COVID-19 could well highlight the possible contribution of local communities to global health. Viruses of Coronaviridae also have a long history of infecting humans. However, the pathogenicity of viruses belonging to Coronaviridae are generally believed to low. Hypothetically speaking, local communities residing in areas with prevalence of Coronoviridae vectors/ reservoirs could have also developed plant based remedies both for curative as well as preventive purposes. In this context the importnace of traditional food plants for the prevention and remediation of Sars-CoV-2 has ben stressed [3-4], and the problematic of the use of wrongly identified traditional medicinal species has been highlighted [5].

In this overview, we assess the contribution of traditional knowledge in the management of the pandemic, and the changes in research under the

Convention on Biological Diversity and the attached Nagoya Protocol, and reflect on the possibilities for future studies in a post-SARS-CoV-2 world.

Keywords: Nagoya Protocol, SARS-CoV-2

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Green Synthesis of Nanoparticles: From Preparation to Applications

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ABSTRACT

Nanotechnology is an emerging field of science. The base of nanotechnology is nanoparticles. The size of nanoparticles ranges from 1 to 100 nm. The nanoparticles are classified into different classes such as inorganic nanoparticles, organic nanoparticles, ceramic nanoparticles and carbon base nanoparticles. The inorganic nanoparticles are further classified into metal nanoparticles and metal oxide nanoparticles. Similarly, carbon base nanoparticles classified into Fullerene, Carbon nanotubes, Graphene, Carbon nanofiber and carbon black. Nanoparticles are also classified on the basis of dimension such as zero-dimension, one-dimension, two-dimension and three-dimension nanoparticles. The nanoparticles are synthesized by using two approaches like top-down approach and bottom-up approach. Since the main methods for producing nanoparticles are chemical and physical methods which are often expensive and potentially harmful to both the environment and the user. So, we did our best in our researches to synthesize metallic nanoparticles using plant extracts and stay away from expensive and toxic chemicals at the same time. Therefore, it is with great pride that our research group is considered a pioneer in the region, and many high quality research articles have been published by our group highlighting the necessary needs of the community [1-22] regarding green synthesis

nanomaterials. After synthesizing different types of nanoparticles, using easy, one-pot, inexpensive and green process, from locally grown plant extracts, different characterization techniques have been used to investigate structure, size, morphology, thermal behavior, surface area, surface charge, chemical composition and optical properties of the nanoparticles. After synthesizing and characterization process, the green synthesized nanoparticles were employed in thin film application, gas-sensing, enhancing solar panel efficiency, wastewater treatment, catalytic application, harvesting sunlight for solar thermal generation and many other applications.

Keywords: Nanotechnology, Nanoparticles, Green Synthesis Method, Nanotechnology applications.

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The Environmental Practices in UAE and Path to Sustainable Use of Energy

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ABSTRACT

The presentation will focus on providing the students and attendees with a brief overview of the history of UAE, its development; and the energy consumption patterns over the years in the country. In addition, the attendees will learn about various environmental strategies and sustainability initiatives in UAE.

As one of the countries in the region with leading renewable energy projects, the presentation will also highlight the existing and upcoming renewable projects in the country along with data about energy use, the efficiency, the segregation of energy responsibilities, distribution of energy, the challenges and its applications. The presentation will continue by discussing the various strategies implemented by UAE government to attain environmental sustainability including, UAE 2030 SDG strategies, UAE Energy Strategy 2050, and UAE vision for Net Zero by 2050.

Towards the end of the session, the presentation will touch upon the role of Emirates Environmental Group as a nongovernment organisation and its contributions towards preserving the environment through the means of education and action programmes. With over 30 years of actively engaging with all sectors of the society in UAE and beyond, EEG will share the accumulated data and observations made and explain to the audience the importance of Civil Societies and partnerships with

academia and their role in the development of sustainable energy practices.

Keywords: Environmental Literacy, Energy Strategies, Civil Societies, Government Role, Projects, Societal Roles.

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Kurdish Ethnobotany: Quo Vadis?

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ABSTRACT

In recent years, field studies concerning local perceptions of nature and traditional ecological and botanical knowledge increased in the Near East. These works focusing on precious local knowledge and practices linked to nature, mainly retained by elderly peoples, have been clearly defined as part of the cultural heritage by UNESCO in 2003 and should be preserved and valorized by all worldwide countries. Diverse field ethnobotanical studies have ethnographically documented traditional perceptions (folk names) and local uses of wild food and medicinal plants in Turkish Kurdistan, but very sparsely in other Kurdish-speaking areas. In this presentation, I will show the results of a few field studies conducted in the past 6 years in Iraqi Kurdistan and among Kurdish communities in Armenia, focusing on the ethnobotany of wild vegetables. I will also point out the importance of this documentation work not only for the herbal and gastronomy sectors, but also for bio-conservation strategies, rural development policies, and ecological and cultural tourism too.

Moreover, I will discuss methodological frames and their bottlenecks and future promising research trajectories, trying to demonstrate that these studies at the crossroad between natural and social/human sciences are the future of what the European Union call “citizens science” and may

be quintessential for promoting the magnificent Kurdish natural and cultural resources.

Keywords: ethnobotany; wild food plants; medicinal plants; cultural heritage

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ICASEE-2022

Abstracts

Annual Background Radiation in Safeen & Hassan-Beg Mountains in Kurdistan Region/Iraq

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ABSTRACT

Inhalation of 222Rn and its radioactive offspring is the most major contributor to effective dose in humans, and natural radiation is the most prevalent source of ionizing radiation. Background radiation measurements from many locations across the world are crucial, especially for human health. The purpose of this investigation was to assess the present background radiation in two of Iraqi Kurdistan's northern highlands' highest altitude locations (Safeen and Hassan Beg). Using the portable PalmRAD 907 Nuclear Radiation Meter and Contamination Monitor CoMo 170, the outdoor-environmental monitoring exposure rate of radiation was assessed in 300 randomly chosen locations. For each location, several measurements were taken, and an average value was used to compute the natural background radiation exposure rate. The exposure radiation dose was 0.26 (Sv/hr in altitude 1900 m (0.131 (Sv/hr in altitude 1000m) in Hassan beg mountains and 0.20 (Sv/hr in altitude 1450 m (0.125 (Sv/hr in altitude 1135m) in Safeen mountains.

In the Safeen Mountains, there is an acceptable association between altitude and exposure rate, as higher altitude places have greater natural background radiation levels, whereas Hassan beg is random.

Keywords: *Background radiation, annual effective dose, radiation dosimeters & altitude.*

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Experimental Evaluation of the Static Magnetic Field Effect on White Blood Cells: In Vivo Study

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ABSTRACT

In this study, we investigated the effect of the static magnetic field (SMF) on white blood cells (WBCs) for female albino rats using a fabricated exposure system of SMFs. Five main groups of animals exposed to 2.4±0.2 milli-Tesla (mT) for four weeks continuously. Five main groups (each group = 4 subgroups) have exposed to a different time of exposure; 1hr, 2hrs, 4hrs, 6hrs and 8hrs/day, respectively. Collected blood samples examined and compared with control values. The results proved that the time of exposure influences the WBCs significantly. One hour of exposure has increased the WBCs counts tremendously (from 50%-79%) in all weeks. However, the 8hrs of exposure reduced WBCs counts highly (from 71%-51%). The 3 weeks exposure trend was an increase, except the 8hrs/day exposure.

Keywords: *white blood cells; hematology; lymphocytes; static magnetic field*

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Appell type Changhee Polynomials Operational Matrix of Fractional Derivatives and its Applications

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ABSTRACT

In this paper, a fractional order differential equation (FDEs), will be solved numerically through a new approximative technique based on Appell type Changhee polynomials. The operational of fractional order derivative will be constructed, then its application together with collocation method in solving fractional differential equations (FDEs) will be presented. The fractional derivatives in the FDEs are described in the Caputo sense. Some numerical examples are finally given to show the accuracy and applicability of the new operational matrix.

Keywords: *Appell Type Changhee polynomials, Operational matrix, Collocation methods.*

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Appell type Changhee Polynomials Operational Matrix of Fractional Derivatives and its Applications

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ABSTRACT

In this paper, a fractional order differential equation (FDEs), will be solved numerically through a new approximative technique based on Appell type Changhee polynomials. The operational of fractional order derivative will be constructed, then its application together with collocation method in solving fractional differential equations (FDEs) will be presented. The fractional derivatives in the FDEs are described in the Caputo sense. Some numerical examples are finally given to show the accuracy and applicability of the new operational matrix.

Keywords: *Appell Type Changhee polynomials, Operational matrix, Collocation methods.*

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Solution of Second-Order Differential Equation Using Least Square Method

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ABSTRACT

This paper study the numerical method for solving differential equation. The least square method (LSM) alonside with the L_2 norm are used to obtain explicit result for solving differential equations with minimum approximation error.

Keywords: *single, paragraph, summarizes, words indentation (maximum 6 words)*

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Coated Meat with Bioactive Edible Films

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ABSTRACT

Today, consumers demand high-quality food without any chemical additives and maintain long shelf life. Meat is a common food product around all the world. The biological composition of it make that more perishability. Consequently, regarding to people desire high quality and an extended shelf life in meat products, bioactive packaging has been investigated. The aim of this resrach was to review edible films and focus on bioactive edible film for preserving meat which is from active packaging. Then, collected the newest research that reported associated edible and bioactive films applied to meat and meat products. It will be showed some example for bioactive substances composite edible coating, and coated on those products and the advantages of bioactive edible was reviewed. Finally, this comprehensive review discusses some main functions of the bioactive edible films. Furthermore, reviwed ueses that type of packaging to enhancing safe meat without deterioration and remain total acceptance and quality. Demonstrate, that type of packaging for prolonging shelf life of storage meat without adding any chemical preservatives.

Keywords: *Active Pachaging, Bioactive Packaging, Meat, Shelf life extension.*

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On The Spectrum Of The Matrix Operator A = (ank) On Hahn Sequence Space h

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ABSTRACT

In this paper, we define a matrix operator A = (a_{nk}) and we show that it is linear and bounded operator on Hahn sequence space. Then we calculate the spectrum of matrix operator A = (a_{nk}) on the Hahn sequence space h. We also determine the point spectrum, the residual spectrum and continuous spectrum of matrix operator A = (a_{nk}) on Hahn sequence space h.

Keywords: *Hahn sequence space h, Linear operator, Fine spectrum of matrix A, bounded linear operator, point spectrum, the residual spectrum and continuous spectrum.*

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On the New Hahn Sequence Space h_d^p

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ABSTRACT

In this article, we define the new Hahn sequence space h_d^p, where $d = (d_k)_{k=1}^{\infty}$ is monotonically increasing sequence with $d_k \neq 0$ for all $k \in N$, and $1 < p < \infty$. Then, we prove some topological properties and show some inclusion relations. The main body of the papar is two fold. On one hand, we calculate the $\alpha -$, $\beta -$, and $\gamma -$duals of h_d^p. On the other hand, we characterize the classes (h_d, λ), where $\lambda = \{bv, bv_p, bv_\infty, bs, cs,\}$, and (μ, h_d), where $\mu = \{bv, bv_0, bs, cs_0, cs\}$ and then we prove the necessary and sufficient conditions of the matrix transformations from h_d^p into $\lambda = \{l_\infty, c, c_0, l_1\}$.

Keywords: *The Hahn sequence space; Schauder Basis; dual spaces; matrix transformation.*

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Chemical Composition of Bryophyllum Pinnatum (lam.) Oken

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ABSTRACT

Natural chemicals with medicinal qualities are an endless source of chemical molecules, making them a valuable source of pharmacologically active molecules. Humans have always looked for these plants, not only for food but also for medicinal purposes. *Bryophyllum pinnatum* is a succulent perennial herb native to Africa and Asia. The plants is traditionally used in northern Nigeria for the treatment and management of various ailments. To date, no studies have been carried out on the chemical composition of *B. pinnatum* in Northern, Nigeria. The study examine the chemical composition of *B. pinnatum* leaves in Northern, Nigeria. Hydrodistillation was used to extract the essential oil using three different solvents (dichloromethane, hexane and hexane-acetone). The chemical composition of the essential was identified with Gas chromatography coupled with mass spectrometry. Thirty five compounds were identified from the essential oil extracted with dichloromethane, twenty five compounds from the essential oil extracted with hexane and twenty three compounds from essential oil extracted hexane-acetone. But the three solvents were found to be dominant by Bis(2-ethylhexyl) phthalate. The study provides the first chemical composition of *B. Pinnatum* which can be fully utilised industry and pharmaceutical companies. These studies show that *B. pinnatum* and certain of its isolated components exhibit antioxidant characteristics, validating its traditional use in the treatment of infectious diseases and free radical damage. Further studies is needed to ascertain the pharmacological and industrial usage of each identified compound.

Keywords: *Bis(2-ethylhexyl) phthalate, Hydrodistillation, Nigeria*

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Seasonal Variation of UV in Erbil City

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ABSTRACT

In this work, Seasonal variability of solar UV radiation, UVI index and its relation to the temperature, relative humidity, solar angle, latitude , cloud cover and day length in Erbil city estimated during March [2019-2020]. This study was done based on existing data. Data used in this study were obtained from Dewan weather station in Erbil city, and using Xplorer GLX data-logger. Based on the results of this study, Solar radiation decreases with increasing relative humidity, and UV index varies with the time of day increase with solar radiation. For the summer months in noon (10:00AM-2:00pM) ranges of UVI in (8- 11) is very high, for the winter months at (10:00AM-2:00PM) ranges about (1.5-3) it ranges low, means low danger from the Sun's UV rays for the average person.

Keywords: *UVindex, cloud cover, day length, solar angle, latitude, relative humidity.*

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Access to and Utilization of Information and Communication Technology by the Teaching Staff at Tishk International University

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ABSTRACT

The purpose of this study is to assess the usage of Information and Communication Technologies (ICT) among TISHK International University (TIU) teaching staff. The data was obtained from 62 teaching staff from Engineering, Information Technology and Education faculties. A structured questionnaire was used to elicit information from participants. Descriptive statistics, Confidence Interval, One-Sample t-test, Two-Sample t-test, and one-way ANOVA were applied to analyze the data to estimate difference of usage among departments and faculties of TIU. This paper confirmed that there is no difference in usage and access to ICTs by female and male respondents, as well as their academic

status at TIU. However, the survey showed that the number of hours spent on ICTs differs among respondents.

Keywords: *Descriptive statistics, Confidence Interval, One Sample t-test, Two-Sample t-test, ANOVA, and ICTs.*

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Microstructure and Magnetic Properties of the AlCoFeMnNiX (X= 0, Ti, Cr, Sn, V, Hf, Ga) High Entropy alloys

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ABSTRACT

The first generation of HEAs has five or more equiatomic components fabricated together in the range of 5-35 at.% concentration. Recently, the second generation of HEAs was identified as non-equimolar compositions. As a result, HEAs have excellent mechanical properties and magnetic behaviour that may be further varied by doping other alloying elements. In the current study, various components (Ti, Cr, Sn, V, Hf, Ga) were added to equiatomic AlCoFeMnNi alloy, and then the microstructure and magnetic properties of the alloys were investigated. Furthermore, seven alloys with new compositions were fabricated in arc melting. Then the materials were dissolved in an argon atmosphere for homogenization. As a result, all samples show ferromagnetic behaviour, and the highest value of magnetization was found in the AlCoFeMnNi alloy (141.1 emu/g). In comparison, the lowest value (51.2 emu/g) was detected through Hf addition to the AlCoFeMnNi alloy. Therefore, the change in magnetic characteristics is due to the phase change related to different element additions. In addition, the calculated coercivity for the

tested alloys was in the range of 78 to 325 Oe, which means that the produced alloys have semi-hard magnetic behaviour.

Keywords: *Microstructure, Magnetic properties, High entropy alloy (HEA), Coercivity, Vibrating sample.*

A Literature Review of Publications Trends to Shape Memory Alloys by Using Bibliometric Analysis

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ABSTRACT

Shape Memory Alloys (SMAs) have been at the lead of research for the past several decades. Shape memory alloys have a variety of applications and are used in many areas. That is why other fields are interested in investigating and researching this area of study. For example, actuators and other responsive devices are products of SME studies applied in medicine, aerospace, fashion, and many other fields. To study the general development of SMA, we reviewed the annual SMA publications, citations, the most active researcher, the core journals publishing SMA investigations, and the most productive countries are all studies in this research using bibliography analyzes. This study will map the progression and highlight the most cited studies, a few of the best review articles, and the most used keyword in the publications are also considered more than fifty years (1971-2021), showing the scientific productivity in the SMA. This will help starter researchers in the SMA area of study by; to begin with, and it's essential to understand how SMA research and conclusions have progressed through time. Furthermore, introduce active researchers/institutes and opens a way for collaborations. This study will also help the decision-makers in the

industry to take advantage of the progression in SMA as it is applied in many areas.

Keywords: *Bibliometric analysis, Scientific productivity, Shape memory alloys (SMAs), Cooperative studies, Shape memory effect (SME)*

The Stratigraphy and Depositional Setting of the Khurmala Formation, NE-Iraq

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ABSTRACT

The carbonate rocks of the Khurmala Formationin Shira Swar section are mainly composed of marine carbonate rocks. The formation characterized by dominat composition of geniculate red algae, green alage, benthic foraminiferal, coral limestone with some fragments of bioclasts and a few planktonic forams. Three main types of microfcaies are identified under microscope: coralligenous-algal wackestone, reefal boundstone, and foramineferal packestone.

The Khurmala Formation contains rarely amount of non-geniculate algae that insufficient for reef-building, but among the common algae are calcareous geniculate and green algae which interpretate to represent lagoonal-back reef environment that confirms the Khurmala Formation. The integrated filed observation with optical characteristics revealed that the Khurmala Formation forms a complex fluctuated backreef and sometimes interfingered with litho-facies close to reefal crest.

Keywords: *stratigraphy, depositional setting, Khurmala Formation, NE-Iraq.*

Demographic status of Adult Leukemia patients in Sulaymaniyah, Kurdistan Region- Iraq

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ABSTRACT

Leukemia is heterogeneous group of acquired clonal hematological malignancies that incorporates diverse biologically distinct subgroups. The aim of the currents study is to shed a light on how demographic status of adult Kurdish Iraqi patients correlates with incidence of different sorts of Leukemia. This retrospective descriptive study was conducted on 484 adult patients who visited Hiwa Cancer Hospital, Sulaymaniyah, Kurdistan Region, Iraq from January 2015 to December 2020. Gender, age, leukemia type along with the demographic status of patients were determined and SPSS version 22 was used for the purpose of data analyzing. Overall 484 patients were diagnosed with different leukemia cases including acute lymphatic leukemia (ALL) and acute myeloblastic leukemia (AML), chronic lymphatic leukemia (CLL) and chronic myeloblastic leukemia (CML) during the study period. There were 307 males and 177 females (ratio 1.73:1), with an age range between 16 and 98 years and a mean age of 54.49 years. The results showed that education level significantly correlated with leukemia commonness with p value 0.0001. In addition, among the patients there were 267 (57%) nonemployee patients, 145 (30%) employed and 63 (13%) were retired, accordingly, the correlation analysis showed that employment status significantly correlated with leukemia as (p-value=0.002) based on (Pearson Chi-Square $p \leq 0,05$). Leukemia in Kurdish Iraqi patients is seen in a both young and old population with male predominance.

Moreover, educational status as well as employments status seems to have major impact on different type of leukemia occurrence.

***Keywords**: Demographic status, Educational level, Kurdish patients, Leukemia*

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A Study of QoS in an Integrated Architecture of WLAN and Hetnet Based LTE-A

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ABSTRACT

In this paper, an integration architecture based on loose coupling concept between WiFi and LTE heterogeneous networks (HetNet) was proposed. The ultimate objective is to investigate the feasibility and the practicality of the design through investigating the performance measures for different applications in the network. As well, a functionality of the load balancing was deployed in the architecture in order to prove that the architecture is flexible and can be opened to any further functionality. The architecture was built and simulated using riverbed network simulator. It was proved that the architecture is working appropriately, and the connectivity of the different technologies were demonstrated by applications communication with each other's in the architecture. Along with, different existing load balancer algorithms were tested on the architecture and numerical results were obtained demonstrating that algorithm is better.

Keywords: *HetNet, Loose Coupling, LTE-A, WLAN, QoS, Load Balancing*

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Model Reduction and Implicit-Explicit Runge-Kutta Methods for Nonlinear Stiff Initial-Value Problems

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ABSTRACT

This work is devoted to studying the mechanisms of the miRNA model and represents the dynamics of components by applying mathematical modelling and we employ the model reduction method by using conservation laws for dimensional. In this regard, we propose a high-order and accurate method for solving stiff nonlinear ordinary differential equations. The curtail idea of this scheme is based on splitting the problem into stiff and non-stiff terms. More specifically, the stiff discretization uses implicit method and the nonlinear discretization uses the explicit method. This is consequently leading to a reduction in the computational cost of the scheme. Numerical experiments show that there is a good argument and accurate solutions for original and reduction problems.

Keywords: *Model Reduction, IMEX-RK methods, stiff problems*

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ADAPTIVE DISCONTINUOUS GALERKIN METHODS FOR NONLINEAR PARABOLIC INTERFACE PROBLEMS

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ABSTRACT

This work is devoted to the derivation of a posteriori error bounds for the fully-discrete discontinuous Galerkin approximations for a class of parabolic interface problems, modelling the mass transfer of solutes through semipermeable membranes, closed by nonlinear interface conditions. The numerical method is based on backward Euler time discretization and an interior penalty discontinuous Galerkin method on meshes consisting of, possibly, extremely general, curved element shapes. Crucially, this allows for exact representation of curved interface manifolds by the mesh. The nonlinearity on the interface closure condition is assumed to be of controlled growth at infinity. However, no monotonicity assumptions are imposed to ensure the relevance of the

presented analysis in practical applications. For this method, we prove a posteriori error bounds in both $L_\infty(L_2)$ and $L_\infty(L_2) + L_2(H^1)$norms, via a suitable reconstruction which, in turn, allows us to built upon the recent concerning a posteriori error estimates for linear elliptic interface problems on curved domains. The effectiveness of all the error estimators and the proposed algorithms is confirmed through numerical experiments.

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Gas Chromatography Time of Flight Mass Spectrometry a Substantial Method for Chemical Compounds Identification

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ABSTRACT

Gas chromatography time of flight mass spectrometry (GC-TOFMS) is a full-spectrum technique that has become attractive and alternative in identifying checmical and biological compounds. The aim of this study is to identify the chemical composition of the supercritical fluid extraction (SFE) of nutmeg seed using GC-TOFMS. A total of 12 supercritically extracted samples from nutmeg seed were analyzed using GCTOFMS for it chemical components. Different compounds with different masses were identified in each sample and were matched to the NIST library, with a significant hit over 80 % on the basis of the specific mass determination of their molecular ions and their major fragments. All the overlaps peaks were optimized to get perfect individual separated peak with good quality mass spectra. The extracted yields were found to possess similar chemical components but varied in each compound concentration. Interesetingly, the main identified group in the supercritical extracts was found to be the aromatic ethers group with the presence of Myristicin as the highest and strongest peak which was found in low concentration in the soxhlet extraction. This is due to the effctivness of the GC-TOFMS method of compounds identification and separation, as well as the applied SFE extraction condition such as temperature, presusure and extraction time. The result indicates that

GC-TOFMS is a substantial enhancement method for detection and separation and particulary for detecting key aromatic compounds. In addition, the detected compounds confirmed the potential impact of supercritical extraction parameters in producing richer extract and fractions that can be used as nutraceuticels.

Keywords: *Supercritical, GCTOFMS, Extracts, Aromatic Ether, Separation.*

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PIK3Ca Mutation Detection in Iraqi Breast Cancer Patients

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ABSTRACT

The breast cancer occupied the forefront among the cancers in Iraq depending on the Iraqi Cancer Committee statistics along the last ten years and the causative agents for this related to the genetic disorder. PIK3Ca oncogene mutation plays an important role in breast cancer incidence. This study aimed to assess the genetic aberrations in Iraq breast cancer patients for specific hot spots in exons 9 and 20 that belong to the PIK3Ca gene by using High-Resolution Melt analysis. DNA extracted from the Paraffin-embedded blocks (FFPE), (22) samples were for the diagnosed breast cancer patients and (17) diagnosed as benign tumors (fibroadenoma) as control. The results of mutation for the PIK3Ca revealed that there were differences between the patient's group by detected mutations in (4.55%) for both hot spots in exons 9 (g. 1635G>A E455K) and 20 (c. 3237C>T. A1026V), whereas no mutation detected in the benign tumors. We conclude that the genetic aberrations in PIK3Ca correlated with the Incidence of breast cancer in Iraq and deeper studies concerning the PIK3Ca mutations were recommended and its alignment with other genetic aberrations.

Keywords: *Breast Cancer, Mutation, High-Resolution Melt (HRM), PIK3Ca.*

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Molecular Detection of Mutations in BRCA1 Gene (exon 11) in Iraqi Breast Cancer Patients and their Families

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ABSTRACT

Detecting gene mutations for cancer patients is very important for finding the genes which can affect the susceptibility and/or prognosis. BRCA1 and BRCA2 recorded and considered as the most common cause of hereditary breast cancer. The whole exon 11 was covered for thirty-six blood samples of Iraqi breast cancer patients by dividing into six amplicons. Also, blood samples from 1 to 2 family members for each patient were obtained; exactly 1st and 2nd degree relationship and ten blood samples of apparently healthy control were collected. Conventional Sanger sequencing was used to detect the BRCA1 mutations in their specific amplicons by using Mutation Surveyor Release version 3.24 copyright 2006 Software to screen for mutations. BRCA1 mutations recorded in 30 cases and all detected amplicons mutations were point mutation (missense type). The detected point mutations in blood samples included (a.2128A>G, T710A), (c. 2271C>T, P724L), (t. 1949T>G, I650R), (t. 2255T>C, L752S), (a. 2938A>C, I980L) and (t.4032T>A, D1344E), none of the relatives included in the study showed similar mutations except in (t. 2255T>C, L752S) appeared in first degree relative, and statistical analysis was significant ($P<0.01$). As a conclusion, it is possible to pass the deleterious mutations through

generations. The detected polymorphisms are very important in early detection of breast cancer and this confirmed by sequencing results.

Keywords: *Breast Cancer, Mutation, High-Resolution Melt (HRM), BRCA1, Exon 11.*

Comparing the effect of Ramipril, Lisinopril and Enalapril on Renal Function, in Rats with Isoprenaline Induced Heart Failure

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ABSTRACT

Angiotensin converting enzyme (ACE) inhibitors are considered as the most frequent used classes of antihypertensive drugs. Beside of their important usage in hypertension management, their utility has extended in long-term management of congestive heart failure (CHF) patients, moreover, diabetic and nondiabetic nephropathies. To know the effect of ramipril, lisinopril, enalapril, on kidney of rats with isoprenaline induced heart failure.

In the current study, 30 Wister albino rats were used ,the first 6 rats (group I) were served as control group, the remaining 24 rats that had heart failure due to receiving isoprenaline 100mg/kg once intraperitonially in which 6 of them were served as positive control

(group II), the remaining 18 rats that also received isoprenaline for induction of heart failure were tested to know the effect of ACE inhibitors on renal function, for 10 days rats in group III, IV, and V received ramipril 5mg/kg, lisinopril 20 mg/kg, enalapril 10mg/kg once daily. Results of this experiment show that inducing heart failure has significantly reduced glomerular filtration rate (GFR). however, the results also show that using ramipril, lisinopril or enalapril have significantly increased GFR. the results show that inducing heart failure and using ramipril, lisinopril and enalapril have significantly increased BUN.

The results show that induction heart failure reduces urine flow and using ramipril, lisinopril, enalapril have significantly increased urine flow. Finally, the results show that induction of HF and using ramipril, lisinopril, enalapril have reduced urine creatinine, but serum creatinine showed no statistically significant difference be- tween them. Results show that Enalapril, Lisinopril and Ramipril have the same impact on the GFR and there is not statistically significant difference between them, the results show that using enalapril, lisinopril and ramipril increase BUN, and the difference between lisinopril and ramipril are not statically significant. the results show that using ramipril, lisinopril, enalapril have significantly increased urine flow, but the difference between them are not significant. the results show that using ramipril, lisinopril, enalapril have reduced urine creatinine, and the difference between them are not significant, on the other hand, serum creatinine showed no statistically significant difference between all group.

Keywords: *Ramipril, Lisinopril, Enalapril, renal and heart failure*

Surface Plasmon Resonance for Detection of Biological Species

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ABSTRACT

Local field enhancement is the key for a wide variety of applications ranging from fluorescent biological imaging, bio-chemical sensor, and higher harmonic optical generation. The strong interaction between light and metals can excite at the metallic interface coherently collective oscillations of free conductive electrons which are called surface plasmon resonance (SPR). Consequently, local field enhancement can be realized. Since this is attributed to the resonantly coupling between the light and metals, any change in the environment or refractive index leads to the change in the surface plasmon resonance.

Recently, the surface plasmon resonance (SPR) technique has attracted the attention of scientific researchers due to its various applications in chemical and biological detection and photodetection [1]–[3]. Various researches have been conducted to enhance the sensitivity or resolution of SPR sensors using different detection methods [4]. Films materials, such as conductive polymers, graphene, and transition metal dichalcogenides, have been used in photodetector applications [5]–[7] due to their featured electrical, optical and chemical properties [8]–[10]. Recent developments in diagnostic methods for disease control demonstrate the demand for reliable, fast, and accurate procedures to determine the presence of viruses in samples. Various approaches have been developed to display nano-length scale objects such as Bacteria and Viruses. Among them surface plasmon resonance (SPR). A polarized light source through a prism incident on a metal nanolayer, constituting

the so-called/evanescent surface wave at a specific angle and wavelength that propagate along metal/prism. The light is reflected at a strong resonance by the gold layer and a lens focuses it onto a CCD camera, recording a time-series of images of the sensor surface. The other side of the gold layer is coated with a substance to which the particles are of interest. The SPR can in real-time any change in dielectric medium caused by any nano-objective capable to image and diagnose diseases in real-time.

Keywords: *Surface Plasmon Resonance (SPR), Au thin-film, sensitivity enhancement, biological molecules, antibody.*

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Immunohistochemical Expression of CD56 in Papillary Thyroid Carcinoma and its Mimics in Erbil, Kurdistan

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ABSTRACT

Papillary thyroid carcinoma (PTC) is the most common primary thyroid cancer, its diagnosis is straightforward depending on the presence of classic nuclear features in most cases. However, there are some mimics, therefore immune-histochemical stains are necessary for equivocal cases. The objective of this study is to evaluate the expression of CD56 in different thyroid lesions and to differentiate papillary thyroid carcinoma (PTC) from its mimics. A retrospective study including 90 patients with different thyroid lesions was investigated from Jan2018 till Jan2020 in Erbil city. Immunohistochemical staining of CD56 on tissue block material was performed. CD56 IHC expressed approximately in all benign neoplastic and nonneoplastic thyroid lesions, but no or focal weak staining was observed in papillary thyroid carcinoma, it showed significant statistical difference ($P < 0.001$). The sensitivity and specificity of CD56 total estimated score for diagnosis of PTC were 91.2% and 92.9%, respectively. The study found the highly significant and effective role of CD56 in distinguishing benign neoplastic and non-neoplastic thyroid lesions (mimickers) from PTC. So CD56 has a significant prognostic and diagnostic role in thyroid neoplastic lesions diagnosis.

Keywords: *PTC, benign thyroid lesions, immunohistochemistry (IHC), CD56.*

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Evaluation of Knowledge, Attitudes, and Practices Regarding Post COVID 19 Complications (Physical, Biological), in Hawler Medical University, KR, Iraq

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ABSTRACT

Covid-19 is defined as illness caused by a novel coronavirus now called severe acute respiratory syndrome Coronavirus2 (SARS-COV-2).

The purpose of this program evaluation is to assess community knowledge, attitudes, and practices (KAP) regarding physical and biological complications of COVID 19. For this survey, a total of Hawler Medical University employers and students will be sampled for survey participation.

COVID 19 infection in female was higher than males. The highest percentage of the patients was in the age group (19-29), the highest percentage of infection was in those individuals with blood group A (34.5%). fever was recorded in 85.2%, cough (60.7%), Sore throat (54.1%), insomnia in (64.8%), chill (59%), myalgia (89.3%), head ache (86.9%), fatigue (81.1%) , the main complications of COVID 19 were acute respiratory distress syndrome, hypertension,

diabetes cardiovascular disease.

The fever causes the increased heart rate (HR) and blood pressure (BP) and these factors effect on patients with cardiovascular disease that were infected with COVID 19 and cause arterial clot and death

Keywords: *COVID-19, Knowledge, Attitudes, physical complications*

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Impact of Physical Inactivity and Pressure on Weight Gain During COVID-19 Pandemic Quarantine in Iraq

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ABSTRACT

Examine the factors that affect weight during quarantine such as physical activity and stress. cross-sectional online survey study included people social demographic, individual behaviors, physical activity and stress level during COVID-19 quarantine among the Iraqi population, by using an online platform. Out of the 661 participants, female 492(74.4%), age range was between 14-72 years old. Individual behaviors, 66% had irregular sleeping habit and 71% physically inactive. Besides, 72.8% lived under pressure. A high significant relation between weight gain and physical inactivity (p value: 0.01) and significant relation between stress and weight gain (p value: 0.038).

physical inactivity and stress were risk factors for gaining weight during quarantine.

***Keywords**: COVID-19, diet, stress, physical activity*

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Design Study of the 455 GHz, 1.027 kW Second Harmonic Gyrotron Oscillator

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ABSTRACT

The gyrotron is a source of high-power microwave coherent radiation. It consists of a magnetron injection gun, which generates an annular electron beam focused into an open cavity resonator along an axial magnetic field. In the cavity, the RF field interacts with the cyclotron motion of the electrons in the beam and converts the transverse kinetic energy into the RF beam. The spent electron beam leaves the cavity and propagates to the collector where it is collected. The present work, the electron - cyclotron maser (ECM) oscillators are high power sources of microwave radiation and have applications in fusion plasma heating diagnostics with potential for radar and telecommunications systems are studied. Electron cyclotron masers are based on the cyclotron resonance maser (CRM) instability between a gyrating relativistic electron beam moving in a (usually uniform) guide magnetic field and electromagnetic radiation, are used. So, this project deals with the design study of a second harmonic gyrotron operating at the mode with 455 GHz output frequency. 241 TE. To come across with all these requirements, all relevant equations are derived and solved numerically by the finite difference technique. A computer code has been fully constructed and used to study the design requirements and properties of the relativistic electron

Keywords: *Gyrotron, Electron – Cycloton Maser, Microwave, Coherent radiation*

Reinforcing the pepper (Capsicum annuum) growth by gypsum and salicylic acid under salinity stress

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ABSTRACT

Salinity stress negatively affects plant growth which leads to the decline in the food source. Nowadays, the rarity of rainfall and high water evaporation rates in some regions is a serious problem in the field of agriculture. Salt accumulation in these soils leads to a decrease in the chemical potential of soil water, and in this condition plants are unable to absorb water. Biological and inorganic amendments can greatly reduce the toxic effects of soil salts.

In this study, a pot experiment was performed to study the ameliorative role of salicylic acid and gypsum on pepper growth characteristics under salt stress. After the appearance of four leaves on seedlings, they were transferred into experiment pots. In the G treatment, the gypsum was added to the soil (0.38 g per 200 g soil) and in G+SA treatment, in addition to mixing the gypsum with soil, the SA was sprayed on the plant leaves in two different times. Two concentrations of NaCl (50mM and 100mM) were used for irrigation every two days and the control was irrigated with distilled water. After 18 days, some growth characteristics including shoot and root length, dry and fresh weight, salt tolerance index, leaf surface area, and chlorophyll content were evaluated. The results showed that the application of gypsum alone and with foliar spray of SA was effective in reinforcing the pepper seedlings under salinity stress, independent of salinity level.

Keywords: *Pepper, gypsum, salicylic acid, salinity*

Tracking the sedimentation settings and diagenetic fluids impacted on Sinjar Formation host rocks, Bekhme area, NE-Iraq

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ABSTRACT

The present work deals with intensive fieldwork and optical observation of Late Paleocene –Early Eocene sedimentary rocks in Bekhme anticline. The detailed field and microscopic observations show a rhythmic bedding and rhythmic alteration in microfacies analyses. Four main microfacies types were identified: (i) wackestone microfacies; (ii) packstone microfacies; (iii) Boundstone microfacies; (iv) Dolostone. The dolostone microfacies contains a rhombohdral dolomite grains identified in the upper part probably linked to enrichemnet of the seawater by Mg fluid. While the wackestones, packestone, and boundstone are frequently contain benthic and planktonic foraminifera with abundant of reefal communities, these constitutes suggest that this sequence is deposited in a basin close to reef zone and back reefal environments.
The new finding in this research study shows that these components and the proposed model for recent environment indicate the Sinjar Formation was deposited at that time, not Khurmala Formation as proposed previously.

Keywords: *Sedimentation settings, diagenetic fluids, Sinjar Formation, Late Paleocene –Early Eocene times.*

Face Mask Detection System

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ABSTRACT

According to the World Health Organization, the coronavirus also known as the COVID-19 pandemic is causing a global health crisis, WHO and Other health organizations recommended wearing face masks as a protection measurement especially in work, school, university, malls, and any public places. The proposed system consists of a Convolutional Neural Network-based system that can recognize faces with masks and without a mask, The dataset used for this project consists of 3835 images of two types of images, people with masks and people without masks. By utilizing the TensorFlow framework we're able to get a 98.80% accuracy rate in training time while training the model with 200 epochs.

Keywords: *Deep Learning, OpenCV, TensorFlow, Facemask*

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Gender Evaluation, Pharmacotherapy, and Management of Blood Cholesterol in Patients of Duhok Province

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ABSTRACT

High fat intakes and inactive lifestyles are becoming the most important concerns in today's modern world. They have led to a growing risk for insulin-resistance syndrome, obesity, hypercholesterolemia, high blood pressure, dyslipidemia, and other metabolic syndromes. Hypercholesterolemia, this metabolic syndrome can put people at higher risk for cardiovascular disease such as peripheral artery disease, heart attacks, strokes. The aim of this study is to evaluate gender differences in total cholesterol levels and study the common medication that are used for the controling and treatment of high blood cholesterol in Kurdistan region of Iraq as well as its side effects. Patients diagnosed with cholesterol were chosen randomly from the medical clinic at Azadi Hospital, Duhok, Kurdisatn region. The records of high blood cholesterol level, and the medication that were prescribed were taken. The effect of age, gender, body weight, lifestyle in their food meals were recorded, in addition to other disease they have. Based on the collected data, 5 prescribed used medication were chosen to evaluate their side effect from previous conducted studies in the literature review. The drug names were Atorvastatin, Rosuvastatin, Fenofibrate, Gemfibrozil and Ezetimibe. The results showed that among those participated patients with hypercholester, around 30 % were diagnosed with high level of blood cholesterol (Hypercholesterolemia) and their records value were ranges

from 230 to 275. Moreover, those with high blood cholesterol, 70% of them were males and only 30% were females. This high cholesterol level rate can be interpreted due to the life style of the participants, such as lack of exercise, and the consumption of too much saturated fat or trans fats. In addition, most of these conditions of cholesterol were associated with an increased risk of cardiovascular disease (CVD). On the other hand, among the prescribed medications used to treat this disease, only the Atorvastatin tablet was having higher side effects than others. These side effect can interact with other risk factors leading to more complication and increase the disease rate or condition. Nevertheless, these conditiobn can be controlled or treated by preventive or therapeutic interventions, modified diet, life style, and exercises. Therefore, understanding the mechanisms by which this disease can be controlled can provide a powerful area of research to help the patient with the targeted therapies.

Keywords: *Hypercholesterolemia, Highfat, Pharmacotherapy, cholesterol, prevention.*

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K-Means-Clustering and Self-Organizing Maps Comparison to Classify the Electricity Generation in Kurdistan

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ABSTRACT

Most fundamental unsupervised learning challenge is clustering. It is the process of grouping elements into groups whose components are "similar but not identical" to objects in other groups. It is a technique for classifying subjects into clusters of similar components; we attempt to identify related items based on their properties. We develop homogenous groupings, or clusters, that are distinct from one another. A Self-Organizing Maps (SOM) network's output, from the other hand, does not really provide groups of locations on the map. The SOM map is now arranged so that the network size on the map corresponds to the number of clusters required. Clustering aim is to find the intrinsic grouping in a group of data set. In this study, two methods for generating power in the Kurdistan region were compared by using methods (Self Organize Maps and K-Mean Clustering) to classify the months the data was in (Iraq-Kurdistan Regional Government Ministry of Electricity General Directorate of Control &Communication Kurdistan Dispatch Control Centre) from 2006 to 2019. The research found that the months were divided into three groups, and that the Self-Organizing Maps algorithm outperformed the K-means strategy in getting the results with the lowest distance in a cluster. As a result, the SOM is the best and most accurate method for data classification, which supports its implementation. The classification process can also be adjusted by the neural network to account for changes in the power generated by electric patterns over time.

Keywords: *K-Means Clustering, SOM, Electricity Generation, Euclidean Distance, Classification.*

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A New Hybridization of Bilateral and Wavelet Filters for Noisy De-Noisy Images

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ABSTRACT

In this work we propose, a hybrid noise reduction algorithm that is a combination of a spatial field binary filter and a hybrid wave field threshold function. These two methods are used to stop Gaussian noise. The hybrid filter is a nonlinear filter that deals with spatial averaging of non-uniform edges. We found it to be an effective technique for image reduction. Determining filter parameters for the mixed filter is important to avoid large differences in results, besides the issue of acceleration velocity. This hybrid model, binary filtering, and Wavelet Thresholding have tried standard images, such as normal eyes, MRI, Roya Face, Ultrasound, X-Ray, and Rawa. Different Gaussian noise was added with different standard deviations σ = 10, 20, 35, 40, and 50. The peak-to-noise ratio (PSNR) signal, MSE, VIF, IQI, and the proposed model MSE between pixels were used as quantitative measures of performance of the relative noise reduction algorithms and then were compared to the models.

Keywords: *Image Denoising, Wavelet Transform, Wavelet Thresholding, Bilateral Filter*

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Forecasting Electricity Generation in Kurdistan Region Using BOX-Jenkins Model

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ABSTRACT

The objective of this research is to identify the best and most relevant statistical model for projecting electrical power generation in the KRI. Data was collected for this purpose throughout a 168-year period (2006-2019). The Box-Jenkins technique was used, and it was discovered that the series is unstable and not random after analyzing it. The essential transformations, namely the square root and the first difference, were used to achieve stability and randomization. The necessary transformations, such as the square root and the first difference, were used to achieve stability and randomness. the analysis showed that ARIMA (2,1,2) is the most appropriate model among the proposed models using some statistical criteria like (AIC, BIC, MSE, MAPE, and RMSE) were used to obtain the model that can be utilized in the prediction. A simulation was conducted in favor to the selected model.

Keywords: *Electricity Generation, Time Series, Box-Jenkins, Forecasting, Simulation.*

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Decorative Cosmetics and Nail Products, Toxicological Source of Some Metals and Natural Method to Minimize It

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ABSTRACT

Cosmetic marketing is one of the most profitable and fast increasing markets in Kurdistan Region of Iraq. The use of cosmetics in recent years has witnessed a wide range, especially with the emergence of social media and its impact on this trade. The average range of frequency of makeup use among consumers in the United States was between 31- 41% in 2017. The market is full of variable cosmetic brands and nail products. Moderate and low-quality brands of cosmetic samples were selected for investigation of heavy metals and chemical composition in the local market. In this research seven set of each of face foundation, eye shadow and nail polish, were assessed. Samples were used to assess Hg, Pb, Cd, As, Mn, Cr, Ni, Co, and Al ions using XRD, XRF and UV-visible Spectrophotometer techniques. Natural chelate that is bio-friendly was used to deplete toxicological metal ions. Absorbing cosmetic products via skin and disposing the expired products exposes human life and the environment to the risk of pollution and the diseases resulting from it and this urges to have a data base for the toxicological sources in these products that are existed in the local market. As well as finding the eco and bio friendly solution to reduce the risk of the harmful metal and heavy ions.

Keywords: *Cosmetics, nail polish, eye shadow, XRD, XRF, heavy metals, Curcumin*

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Survey of Snails in Zobe Reservoir Dustin-Ma Katsina State, Nigeria

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ABSTRACT

Freshwater snails are mollusks freshwater gastropods. Samples of freshwater snail species were collected in the Dutsinma zobe dam, katsina province, by using scoop net, and handpicking. Based on shell morphology, the analysis described 2,600 aquatic snails. Snail species were Biomphalaria pfeifferi, Bithynia tentaculata, Melanoides tuberculata, Gundalachia radiata, and Achatina fulica. The dominant species found was Achatina fulica as it has the highest number of species collected, Gundalachia radiata 27, Lymnea natalensis14, Biomphalaria pfeifferi 10, Melanoides tuberculata 689, Bithynia tentaculata 860. This study shows Zobe reservoir contains 6 different snail species. The snails species are Biomphalaria pfeifferi, Bithynia tentaculata, Melanoides tuberculata, Achatinafulica, and Gundalachia radiata. Surveillance is required to prevent disease epidemics vectored by snail species in nearby communities.

Keywords: *Snails, fresh water, scoop net, mollusks, gastropods*

Solar Energy for Traditional Houses in Erbil, Iraq

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ABSTRACT

Apart from several days in winter, Erbil city experiences sunny days throughout the year. This city characterized by traditional courtyard houses which provide environmental system, this syatem achieves an optimal balance among construction, ventilation, and social structures. In addition to inner courtyard element, the elements which were used in most traditional houses of the city of Erbil include: fountain, windcatcher, iwan and basement. These elements are most effective strategies for getting the best environment inside the buildings. They contribute with providing nice micro-climate. However, upper floors of traditional houses do not get enough advantages of these elements. Also, duo to heat gain from flat roofs in summer, interior spaces of upper floors suffer from overheating. In other hand, there are widespread energy shortages across the city of Erbil. Using solar panels can contribute with providing power efficiency and treat heat gain from roof, but some barriers might be restrict using them in traditional houses. This research aims to study the solar radiation on the roofs of traditional houses in the city of Erbil, and to study the barriers restricting the use of solar panels in traditional buildings. Solar radiation at the roofs of a group of traditional houses in the old city of Erbil were studied. Data were collected and, a computer model was used for analysing the data. The results of research demonstrated that, the average of kilowatts that can be produced yearly by solar panels on the roof of studied cases is 200-kilowatt/M2. This will provide renewable energy for households around a year. Furthermore, using the solar panels on the flat roofs contribute

with treating overheating via providing shadow on the roof. Moreover, using renewable energy reduces the consumption of fuels and reduces emissions.

Keywords: *Renewable Energy; Traditional Houses; Roofs, Erbil, Iraq*

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Chemomicroscopical Examination and Physicochemical Evaluation of *Detarium Icrocarpum.* (Fabaceae)

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ABSTRACT

Detarium microcarpum. Is a plant that belongs to the family Fabaceae. The stem is erect, woody and 4-10cm in diameter. In Nigeria the fruits are edible but with non-edible seeds. Chemomicroscopical and physicochemical evaluation of *Detarium microcarpum* were carried out, aimed at identifying, authenticating and standardizing the powdered materials of the leaf, stem and root. The parameters were ash values, extractive values, moisture content, and water soluble and insoluble ash. In the chemomicroscopical evaluation test for tannins, cellulose, starch and calcium oxalate crystals were also carried out using standard methods. The results obtained in the chemomicroscopical studied revealed the presence of cellulose, starch, tannins, calcium oxalate crystals, for the whole samples leaf, stem bark and Roots powdered samples. The results of physicochemical evaluation of the plant parts showed that the leaf, stem and root bark powdered materials had total ash of 4%, 1.5% and 1.5%; water soluble ash of 1. %, 1.3% and 1.4%; moisture content of 3.5%, 5.5% and 3%; extractive yield of 9.2%, 5.6 and 9.8% respectively. The results of the presence findings can be used for identification and authentication of the plant as well as establishing standard for quality, purity, level of adulteration and, efficacy in Ethnomedicine.

Keyword: *Chemomicroscopy, Physicochemical, Detarium microcarpum.*

Determination of Heavy Metals in Goat and Cow Hides Singed with Scrap Tyre in Tudun Wada Zango Abattoir, Kaduna State, Nigeria

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ABSTRACT

Singeing of goat and cow hides is the major process by which fur on the skin of slaughtered animals is burnt in open fire using materials like firewood and charcoal because it preserves the animal's hide for consumption. Tyres have been reported to contain heavy metals that could pose health threats to hides consumers. This study was done to determine the concentration of heavy metals in goat and cow hides singed with scrap tyre in Tudun Wada Zango Abattoir, Kaduna. 42 goat and cow hides samples were analysed. Samples were collected before singeing, after singeing and when singed hides were washed. Furthermore, scraped soot from singed hides were collected and determination of heavy metals. Samples were prepared according to the method of Association of Official Analytical Chemists and concentration of Lead, Cadmium, Zinc and Iron were determined using Atomic Absorption Spectrophotometer. The concentration of Lead and Cadmium in tyre singed goat and cow hide have exceeded maximum permissible limit (MPL) of European Commission Regulation (ECR) while that of Zinc and Iron were below MPL. Washing reduced the concentration of heavy metals in both hides but levels of Lead and Cadmium were still above MPL. This makes goat and cow hides singed with scrap tyre unsafe for consumption. The scraped soot obtained from the singed hides had high concentrations of lead and Cadmium and can contaminate nearby water bodies and soil. Therefore, proper laws should

be enacted to stop butchers from using scrap tyre as source of fuel to singe hides.

Keywords: *Hides, Fur, Singeing, scraped soot*

Determination of Heavy Metals in Soil and Some Selected vegetables Irrigated with Waste Water Along Asikolaye Stream Kaduna, Nigeria

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ABSTRACT

Contamination of soil and vegetables with heavy metals may be caused by irrigation with water contaminated by domestic waste, fertilizers and agrochemicals. Studies have shown that vegetables can absorb some heavy metals from waste water used for irrigation by farmers and these heavy metals can accumulate in the body when these vegetables are consumed. This study was conducted to determine the level of some heavy metals in vegetables, soil and irrigation waste water along Asikolaye stream, Kaduna. A total number of 18 soil samples, 24 water samples and 18 vegetables were randomly collected and analysed for Lead, Cadmium, Zinc, Iron and Copper using atomic absorption spectrophotometer. Trace amount of Lead was found in spinach soil while high concentration of Lead exceeding maximum permissible limit (MPL) of World Health Organisation (WHO) was observed in cabbage soil and lettuce soil. However, low concentration of Cadmium, Zinc, Iron and Copper were observed in the analysed soil samples. Irrigation waste water were found to contain high level of Pb, Cd and Fe exceeding MPL of WHIO. Furthermore, Vegetables were found to contain high level of Pb and Cd exceeding the MPL set by WHO while Zn, Fe and Cu were found in low concentration. It was concluded that Vegetables cultivated at Asikolaye farm are unwholesome for consumption because they contain some heavy metals that are toxic to the body.

Keywords: *Irrigation, agrochemicals, unwholesome.*

Response Of Parkia Biglobosa to NPK and Mycorrhiza Inoculation at Early Stage of Plantation Establishment in Sudan Savanna of Nigeria.

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ABSTRACT

Inadequate moisture and low soil nutrients during trees specie establishment in their permanent fields is detrimental to growth and development of the species resulting to slow growth rate. *Mycorrhiza* and NPK inoculation can be used to enhance and hasten plant growth rate. To investigate the efficacy of *Mycorrhiza* and NPK inoculation at different levels on establishment of *Parkia biglobosa* in the permanent field, field trial was conducted during the rainy seasons of 2020 at Shelterbelt Research Station Kano. The experiment consists of four treatments laid out in Complete Randomized Block Design (CRBD) and replicated three times; NPK 5 g plant^{-1} (Treatment A), *Mycorrhiza* 5 g plant^{-1} (Treatment B), NPK 2.5 g plus *Mycorrhiza* 2.5 g plant^{-1} (Treatment C) and control (Treatment D).The growth parameters measured include plant height, stem girth, number of branches and number of leaves plant^{-1}. Data were collected at 2 weeks interval after application of treatments for 12 weeks. The data collected were subjected to analysis of variance (ANOVA). Means separation was carried out

using Fisher's Protected LSD. The result shows that *Mycorrhiza* and NPK in synergy (treatment C) at 12 weeks after transplanting was observed to have significantly influenced plant height and stem girth with tallest plant of 32.13 cm and thickest stem girth of 7.43 cm compared to the control treatment. Plant treated with *Mycorrhiza* produced significantly highest number of leaves of 72 and number of branches (12) compared to other treatments. The study concludes that morphological growth of *Parkia biglobosa* can be enhanced by *Mycorrhiza* and NPK inoculation which is statistically significant (0.05) compared to control treatment.

Keywords: *Mycorrhiza, NPK, Parkia biglobosa*

Quartz Crystal Microbalance a Powerful Technique for Nanogram Mass Sensing

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ABSTRACT

A quartz crystal microbalance (QCM) is an acoustic transducer that sends an electronic signal when a mass change is detected on the sensor surface of an oscillating quartz-crystal resonator. QCM can apprehend a slight amount of materials in the nanogram range quantitatively from the shift in resonance frequency under vacuum, gas phase, and a liquid environment. QCM is produced by oscillating a piezoelectric, single-crystal quartz plate to measure mass. Quartz's inherent property of piezoelectricity is the basis of QCM operation. However, quartz resonators did not become of interest commercially until immediately before the world war. This review article aimed to evaluate the recent articles highlighting the role of the quartz crystal microbalance in nanotechnology as mass sensing. One of the fundamental driving forces in nanotechnology that positively impact related research areas is new measurement techniques.

Keywords: *QCM; nanotechnology; piezoelectricity; resonance frequency; mass sensing; nanogram.*

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Assessment of Heavy Metal Exposure in Soil Around Tannery Industry in Daura Local Government Area Katsina State, Nigeria.

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ABSTRACT

A study was conducted on the Assessment of soil exposed to heavy metals around tannery sites in the Daura local government area of Katsina state. Soil samples were collected from the locations indicated at the depth of not more than 10 cm using plastic scoops and were placed in polyethylene bags, sealed, and transported to the department of biological sciences laboratory, Al- Qalam University for further analysis. The soil samples collected were digested using standard wet digestion methods and analyzed for heavy metal content using atomic absorption spectrophotometry. The enrichment factor, contamination factor, pollution load index, and target hazard quotient (THQ) were calculated. In addition, carcinogenic and non-carcinogenic risk assessment was carried out using Monte-Carlo computational prediction analysis. Results show that the total mean concentrations of the heavy metals decreased with depth in soil samples and distance from the dumpsite. The results of this study indicates that Lead compound (Pb) (0.099129 + 0.0087 mg/kg) was observed with a higher value of concentration around the sites of the tannery industry. The subsequent increase in the amount of lead can expose children, adults, pregnant women to the risk of permanent adverse health impacts. Farming activities should be

discouraged around sites close to the tannery industry and children should be prevented from playing in those areas.

Keywords: *Heavy metal, Soil, Daura, Katsina State, Nigeria.*

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Evaluation of Blatella Germanica (German Cockroach) as Carrier of Protozoa in Kano Metropolis, Nigeria

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ABSTRACT

The occurrence of Blatella germanica in Kano metropolis, Nigeria, is of public health significance, as they have been recounted as reservoirs of pathogens. This study is aimed at evaluating the presence of protozoa in B. germanica.

A total of 1,498 B. germanica were trapped and screened for the presence of protozoa using sedimentation technique.

Five (5) species of protozoa including Cryptosporidium parvum, 35(2.34%), Entamoeba spp., 108(7.21%), Gregarina blattarum, 106(7.08%), Lophomonas blattarum, 79(5.27%), Nyctotherus ovalis, 102(6.81%) and mixed occurrence of G. blattarum and L. blattarum, 33(2.20%) were recorded, with overall incidence of 465(31.04%). Female B. germanica had higher incidence, 255(17.02%), compared to males, 210(14.02%), with more protozoa detected from hindgut, 288(19.23%), than foregut, 146(9.74%), and midgut, 31(2.06%).

Keywords: *Cockroach, Blatella germanica, Protozoa, Kano*

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Assessment of Oxidative Stress Biomarkers in *Rattus norvegicus* (Wister Rats) Experimentally Infected with *Trypanosoma brucei brucei*

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ABSTRACT

Aim and Scope of the Study: The aim of the study is to evaluate parasite intensity and oxidative stress markers associated with trypanosomiasis disease in experimentally infected *Rattus norvegicus* (Wister rats). Materials and Methods: *Rattus norvegicus* were sourced, housed and managed meticulously, following the Animals in Research: Reporting *In Vivo* Experiment (ARRIVE), as well as Planning Research and Experimental Procedures on Animals: Recommendations for Excellence (PREPARE) guidelines for reporting animal research. Rapid Matching method was used to estimate the daily parasitaemia. Glutathione S- , superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase and reduced/oxidized glutathione were evaluated.Conclusions: Findings from this study revealed that, majority of the oxidative stress biomarkers showed positive correlation with Trypanosomes.

Keywords: *Biomarkers, Oxidative stress, Trypanosomes, Trypanosomiasis*

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Biosorption of Crystal Violet Dye by Aspergillus Striatus, *Bacillus megaterium*, *Chlorella vulgaris* and *Fusarium equiseti*

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ABSTRACT

Crystal violet is a toxic synthetic triphenylmethane dye that is used as a biological stain and in dyeing textile materials. It is not easily degradable and remains in the environment for longer periods, causing serious contamination.

Aim and Scope: The study was carried out to assess the biosorption potentials of *Aspergillus striatus, Bacillus megaterium, Chlorella vulgaris* and *Fusarium equiseti* on Crystal violet dye. The scope of the study is limited to the use of microbial biomass generated from *Aspergillus striatus, Bacillus megaterium, Chlorella vulgaris* and *Fusarium equiseti*, in decolourization of crystal violet within 24 hours of inoculation.

Materials and methods: Direct inoculation of pure cultures of the biomass of individual species into the dye solution.

Conclusion: In conclusion, all the four species displayed positive potentiality in biosorption of the dye with *Fusarium equiseti* having the highest absorption and *Bacillus megaterium* the least.

Keywords: *A. striatus, B. megaterium, C. vulgaris, F. equiseti, Crystal violet, Biosorption*

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Determination of Heavy Metals in Dump site at Katsina State

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ABSTRACT

Heavy Metals are any metallic element that has a relatively high density and is toxic or poisonous at low concentration. Heavy Metals are general collective term, which applies to the group of metals and metalloids with atomic density greater than 4 g/cm^3. most of these metal ions can be released from industries, agriculture and individual household and are in simple cationic forms. This study aimed at determining some heavy metals contents in dump soil along Federal College Education (F.C.E.) Katsina. Three samples each were collected differently at the vicinity of the tannery and the surrounding tanneries, 10m away a nearby farms and nearby growing plants. Control samples was also collected far away from these areas for comparison. A distance between 5 to 10 m was maintained between each sampling point to study the metal distribution of the study area. Atomic Absorption Spectrophotometer (AAS) with air acetylene flame were used for the metal analysis. The results of the three samples studied obviously indicates that all the soil samples have Manganese concentration in the in the highest degree (A 3.83 mg/kg, B 3.652 mg/kg, C 6.602 mg/kg) while Co: 0.048 mg/kg, Cd: 0.028 mg/kg, Cd: 0.026 mg/kg) respectively indicates lowest concentration in the three

samples. All of the soil samples contain high manganese concentrations and other heavy metals are present in negligible amounts. This means that manganese-containing waste is circulating in our environments at random. Contamination or soil pollution caused by high manganese concentrations in our environment is extremely dangerous since it puts domestic animals' and humans' health at risk.

Keywords: *heavy metals, dump soil, Atomic Absorption Spectrophotometer (AAS).*

Microbial Contamination on Used Surgical Masks among students during COVID-19 in Faculty of medicine in Koya University

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ABSTRACT

The disposable masks including surgical masks original developed to filter droplets containing microorganisms expelled from the mouth and nose. It was introduced by World Health Organization (WHO). To assess the relationship of bacterial and fungal contamination on used surgical masks worn by the students, personal and microbial air quality in the inside area. This cross-sectional study of 30used surgical masks collected from 30 students to culture for bacterial and fungal counts. This study was carried out at the faculty of medicine.Group of isolated bacteria and fungi were preliminarily identified by Gram's stain .The study was conducted with the ethical approval of the ethical committee in faculty of medicine . The bacterial and fungal contamination on inside area of used masks were 24samples positive and 6 samples negative that mask swabs collect from male and female students. The predominant isolated bacterial and fungal contaminated on inside area of the used mask s,Staphylococcus.spp. (22)=(37%),Micrococcus spp.(10)=(33%),Bacillus spp.(4)=(13%)and Streptococus spp.(3)=10% respectively. The fungal spp in (4)samples (Monilia). in total 30 samples just 7 of them have caught and inflammation in the upper respiratory tract.

Keywords: *single, paragraph, summarizes, words indentation (maximum 6 words)*

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Effect of Roasting Conditions on Sensory Attributes, Polyphenolic Content and DPPH Radical Scavenging Activity of Whole Peanut (*Arachis hypogaea*)

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ABSTRACT

Roasting is a dry heating method of cooking applied to foods including peanut. Maillard reaction is the complex reaction taking place during roasting which affect both the phytochemicals and sensory attributes of food. This study was conducted to determine the effects of different roasting temperature and time on sensory attributes, free radical scavenging activity and phenolics content of whole peanut kernels. Whole peanut kernels were roasted at different temperatures (130-150 °C) at four different durations (5-20 min). Finding revealed that peanut roasted at 130, 140 and 150 °C for 15, 10 and 5 min respectively received significantly highest ($p<0.05$) sensory scores in all the parameters investigated. Therefore, they were evaluated for phenolic content (TPC), total flavonoids content (TFC) and free radical scavenging activity. Total phenolic content, total flavonoid content and DPPH scavenging activity were found to increase during roasting compared to unroasted counterpart. Peanut roasted at 140 °C for 10 min had the highest total

phenolic contents of 67.26 ± 1.77 mg GAE/g, while peanut roasted at 150 °C for 5 min was found to contained the highest TFC of 12.91 ± 0.56 mg QE/g. The highest DPPH radical scavenging activity was found in the roasted sample at 140 °C for 10 min with IC_{50} value of 417.44 μg/mL. It can be concluded that roasting significantly ($p<0.05$) affected the bioactive contents as well as the scavenging activity of the whole peanut.

Antibiotics Resistance Among Urinary Tract Infection Isolates in Koysinjaq City –Kurdistan Region –Iraq.

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ABSTRACT

Aims: Because of the uncontrolled and widespread use of antibiotics, the resistance pattern of Uropathogenesis changing drastically, the study aimed to identify the common Urinary Tract Infection (UTI) causing pathogens in the Koysinjaq city and to check the performance of available antibiotics used by those patients.

Study Design: Random 114 UTI patients who exhibited general UTI symptoms were included in our cross-sectional study. A medical proforma was prepared to input the information associated with the experiment including symptoms of patient's age, sex, laboratory diagnosis, and antimicrobial susceptibility.

Methodology: Urine samples from 114 suspicious urinary tract infected patients (UTIs) were collected as described by Thomson and Miller. Bacterial isolates were tested to identify the isolated and evaluated their antimicrobial susceptibility by Kirby-Bauer disk diffusion technique to 23 antibiotics.

Results: Among 114 UTIs, 107 urine samples were showed positive bacterial cultures, including 31(27.2%) *E.coli*, 36(31.5%) *Staphylococcus spp* (*S.aureus*, MRSA, *S.epidermidis* and S. *saprophyticus*), 21(18.4%) *Streptococcus spp* were mostly *S.agalactiae.*, 13(11.4%) *Enterococcus fecalis*, and 10(8.8%) *Klebsiella pneumoniae*. Comparative antibiotic resistance profile showed that the isolates are multiple drug resistance (MDR) and highly resistant to Ampicillin/cloxacillin (51.85%),

Erythromycine, and Ceftriaxone (49.38%). On the contrary, the strains showed significant resistance to Ceftazidime (40.74%), Azithromycin (37.04%), Tetracycline (37.04%), Ampicillin (35.80%), Clindamycin (32.09%) Amoxicilline (29.62%), Aztreoname (20.98%) Cefepime (16.04%) Cefazoline (13.58%), and Ceftazidime (13.58%) showed significant resistance.
Conclusion: Our results could be helpful to compel rational antibiotic use for UTIs. High antibiotics resistance to uropathogens, such as Ampicillin/cloxacillin, Erythromycine, and Ceftriaxone has been observed in a significant number of patients in Koysinjaq city, in addition to the presence of UTIs had co-infections, therefore our study may provoke further investigations into the mechanisms of antibiotic resistance for particular microbes.
Keywords: *Urinary tract infection; Koysinjaq city; Antibiotic resistance, Uropathogens.*

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Magic Fitting Room Mirror

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ABSTRACT

This thesis is the field of augmented reality (AR), in which 3D virtual objects are integrated into a 3D real environment in real time. It describes the medical, dentistry, visualization, furniture, assisting pilot, and vehicle applications that have been explored. This paper describes the Virtual fitting rooms (VFR) bring great opportunities to the fashion industry by enabling consumers to virtually try on products. However, while VFRs have technically been available for a while, they are less utilized because of consumers potential concerns of accuracy of the simulation. Moreover, a variety of VFR technologies exist in the marketplace with each using different solutions and with different capabilities. Therefore, this thesis we are proposing to visualize the apparels on the human body with real time tracking and animations. ARKit which is augmented reality API by Apple is proposed to be used and the proposed system. The core of the system is body tracking API that is the newest and most cutting-edge feature provide.

Keywords: *Augmented Reality, ARKit, Unity3D*

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Frequency of Use of Point of Care Tests at Public Health Centers

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ABSTRACT

In the recent years, point of care (POC) tests have gained attention in the scientific community as it is valuable tool in diagnostic labs, mainly because of its low cost, fast turnaround time, and ease of use. In developing countries, updated training courses and certificate programs aimed at improving quality of POC has emerged. However, in low income countries there is an increasing trend to use POC tests without proper certification programs. POC has many limitations and many factors affect the accuracy of the results which are usually ignored by health care practitioners. The main aim of this study is to investigate general trends and frequency of use of POC tests, also to analyze the attitude and knowledge of laboratory personnel and health care workers toward POC devices.

A qualitative study was conducted in Sulaimani city, northern Iraq, in January 2022. seventy health care workers were included in focus groups, consisting of laboratory technicians, clinical and medical scientists, junior and senior nurses, and medical doctors. A questionnaire was constructed which contained information about the participants' characteristics, type of the POC devices used, frequency of use, quality of instruments and whether the health care had specialized training on these devices, and their knowledge on possible sources of analytical and pre-analytical errors.

Eleven different POC tests were identified as currently being commonly used at public and health centers at Sulaimani city, their frequency of

use of POC tests varied from sometimes to all the time (100%). For the following tests the frequency of POC tests were 100% of times, these tests included urine chemistry dipstick, virus tests at emergency departments, Fecal occult blood test, HCG pregnancy tests. For CRP tests, only 11.3% of the tests were performed by dipstick tests. For glucose and glycated hemoglobin (HbA1c), the results varied, glucose dipstick tests was used in 100% for first time patients at diabetes center, the center later used Roche immunoassay to measure glucose for confirmed registered diabetes patients. The results of the questionnaire showed that both lab personnel and other health care practitioners lacked knowledge about the limitations of devices used, the accuracy of the devices, the common pre-analytical errors affecting POC results, 90.2% of respondent were unaware about the quality control scheme for POC devices and didn't perform any quality control measures, all respondent were interested in attending training courses to improve the quality of the tests they perform, 90.1% junior doctors favored training at the end of their medical school years.

POC tests are widely used at public hospitals, emergency rooms, intensive care units, wards, outpatient clinics. Despite their common use, POC are widely misinterpreted and most health care practitioners whether they are lab personnel or other medical staff practitioners are misinformed about the types of the devices, their accuracy, and common sources of pre-analytical and analytical errors which usually affect test results and hence affecting patient diagnosis and prognosis. In the future, it is crucial to train all health care practitioners through seminars, workshops and certificate diplomas, to ensure a better quality of tests performed by the POC devices.

***Keywords**: clinical biochemistry laborotary , point of care tests, error frequency*

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Formulation and Evaluation of Cefotaxime Sodium Loaded Emulgel for Topical Bacterial Infections

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ABSTRACT

The bacterial infections are very common and become a serious issue like in case of pelvic inflammatory disease, meningitis, pneumonia, urinary tract infections, sepsis and gonorrhea. Generally, these bacterial infections are treated by using antibiotics like cefotaxime that is a semisynthetic, β-lactamase resistant, third-generation broad-spectrum cephalosporin. It interferes with the bacterial cell wall synthesis of numerous gram-positive and gram-negative bacteria by binding to one or more of the penicillin-binding proteins (PBPs). The nausea, allergic reactions, and inflammation at the site of injection and *Clostridium difficile* diarrhea are the common side effects of cefotaxime.

The topical antibacterial dosage forms like creams, gel, and ointment have some demerits and low duration of drug release. The emulgel is an alternative for topical drug delivery with several merits like enhanced skin penetration and improved bioavailability, reduced dosing, improved patient acceptability with targeted drug delivery, freedom of termination of the therapy at any time, drug delivery in controlled fashion for prolong duration.

The objective of proposed study was to develop an emulgel of cefotaxime. The 2^3 experimental design was used to prepare various emulgel batches to determent the effect of liquid paraffin, span 20 and tween 20 on the performance of emulgel. The Batch F1 showed the maximum drug release and Batch 8 showed the least drug release up to 240 minutes. The drug release kinetics study of Batch 8 showed the Higuchi-Matrix as a best fit model and the Fickian Diffusion as a mechanism of drug release with R^2 value 0.9158 and K value 8.4741.

Keywords: *Topical, delivery, emulgel, cefotaxime, cephalosporin, antibiotics, Carbopol*

Bioherbicidal Actions of Common Purslane on Seed Germination and Growth of Some Crop and Weed Species

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ABSTRACT

This study was conducted to examine allelopathic actions of Common Purslane Portulaca oleracea L. aqueous shoot and root extracts on germination of seeds and some growth parameters of wheat (Triticum aestivum) and rapeseed (Brassica napus). The experiment was performed in sterilized Petri dishes for one week at 22 °C. The experiment was arranged for completely randomized design. The concentrations were chosen for this study as (0%, 3%, 6% and 9%). The results indicated that the higher concentrations (6% and 9%) of both shoot and root extracts of common purslane caused significant reduction in seed germination whereas the lowest concentration caused the least negative impact on seed germination. Other growth polarimeters such as shoot and root length and shoot and root oven dry weight were significantly inhibited by the application of both Common Purslane aqueous shoot and root extracts at concentrations (6% and 9%) in wheat T. aestivum and rapeseed B. napus. However, dicot B. napus turned out to be more effected than monocot T. aestivum. The findings of this study suggest that common purslane aqueous shoot and root extracts can be recommended to utilize as bio-herbicide to supress seed germination and growth of weeds.

Keywords: *Allelopathy, common purslane, Bioassay, weed management, bio-herbicide.*

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Antifungal Impact of Some Medicinal Plants and Natural Products on Candida albicans and Its Biofilm Formation Capability.

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ABSTRACT

The yeast *Candida albicans* is one of the most common pathogens of medical concern. It can cause diseases ranging from superficial and topical infections to systematic disseminated medical illnesses. The ability of this opportunistic pathogen in forming biofilms is an asset to nourish and inhabit infected areas. Eradication of biofilms and its disruption is a great medical challenge to treat infections caused by *Candida albicans*. The yeast could develop antifungal resistant throughout decades, which is mainly due to their dimorphic phenomenon and biofilm construction. The use of medicinal plants has been used by ancient populations of humanity civilizations for the cure of fungi. Many chemical ingredients have been proved to have impact on the growth and biofilms of fungi.

In this investigation, certain medical plants and natural products with antifungal action were used, such as Galls of *Quercus infectoria*, *Cyprus rotundus*, and Alum extract against of *Candida albicans* atcc10231 *in vitro* and biofilm development. The well diffusion method was used to determine the sensitivity and Minimal Inhibitory Concentration (MIC) of the medical plant and natural substance were obtained. Zones of inhibition were recorded in concentration of 200% of the extracts. The ethanolic extract of *Cypeus rotundus* and interaction of and Alum

showed best inhibitory zone of 23 mm. While the watery extract *Quercus infectoria* showed an inhibition zone of 22 mm. The MIC records were 20000 µg/ml for *Cyprus rotundus* was, 1250 µg/ml for *Quercus infectoria*, 15000 µg/ml for Alum, and 80000 for an interaction of Alum and *Q. infectoria* extracts respectively. These MIC values were utilized to assess effectiveness of these extracts in the disruption of Candidal biofilm formation *in vitro*. Standard biofilm formation methodology using RPMI medium were performed. Biofilm disruption were assessed. Extracts of *Quercus* gall, *Cyprus rotundus*, and alum extract were found to have a substantial inhibitory effect on *Candida albicans* ATCC10231 growth inhibition, as well as the production of biofilms. This study provided an insights for the use of medicinal plants in certain concentrations. Also, this is the first approach to study the biofilm of *Candida albicans* in RPMI medium in the Kurdistan Region of Iraq. The results of this study pave the way toward further investigations for the scientific support of the use of medicinal plants to disrupt biofilms. The combination of the used extracts can enlighten the synergetic impact of those extracts and other medications to be used for treatment of fungal infections.

Keywords: *Antifungal activity, Quercus Infectoria, Cyprus Rotundus, Alum Extract, Candida albicans, Well Diffusion.*

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Improving Prediction Accuracy of Lasso and Ridge Regression as an Alternative to LS Regression to Identify Variable Selection Problems

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ABSTRACT:

This paper introduces two main interested regularization techniques, namely Lasso and Ridge Regression method. They both differ in the way they assign a penalty to the coefficients. Lasso linear regression, known as L_1 Regularization, Ridge regression is known as L_2 Regularization. There were two major purposes of regression models which are explanation and prediction of scientific phenomena. Explanation is obtained by producing interpretable models through variable selection, while prediction accuracy is optimized by balancing the bias and variance of predictions. Lasso regression is called Penalized regression method, it is adding bias to estimates and reduces variance to improve prediction. Ridge regression has an introduction of a small level of bias to get long-term predictions. Here, both regression method has been introduced as an alternative to the least square method (LS) in the presence of multicollinearity. since they deal with multicollinearity display the ideal properties to minimize the numerical instability that may occur due to overfitting, Therefore, improve prediction accuracy can be achieved. The dataset of Corona virus disease (Covid-19) was taken for this study, which has affected on the world life totally. Especially in our region (Kurdistan), where life has changed and many people have suffered from this dangerous disease. Test data is used to analyze advantages of each of the two regression methods, the results demonstrate that the Lasso procedure is able to produce reliable results towards the presence of multicollinearity and more accuracy prediction method than Ridge and

LS methods when compared in terms of accuracy of predictions by using NCSS10, EViews 12 and SPSS 25.

***Keywords**: Methodology, Regularization, Lasso regression, Ridge regression, multicollinearity.*

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Bone Age Assessment by Using Different Methods

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ABSTRACT

Bone age is a measure of the degree of skeletal maturity of a child. Bone age is often requested by pediatricians and endocrinologists are used to compare the child's age to identify diseases that may result in short or tall of the child's height. Also, in healthy children, the predicting height can be counted using bone age. Can be used to determine chronological age when accurate birth records are not available. So at times it requires a lot of bone ages during immigration and when there is a law suits as well as during sports competitions. The first aim of this research was to know what the bone age in Erbil city depends on, the second aim of this study is about one of the benefits of bone age that can be used for predicting adult height especially for child's with delayed development. Also, using the ways that are used to know the age and longevity by other countries to familiarize the experienced people in this field especially doctors. This research was done in Erbil city in July by receiving data in several hospitals including Raparin, Helena, and Rizgari also with many medical centers with the help of many qualified doctors and experts in this field. A radiograph of the left hand /wrist–x ray is taken with a single DP view that encompasses the distal radius and ulna, as well as all of the fingers.For assessment bone age left hand-wrist x-ray was used and then carpal bones, metacarpal bones, phalanges, radius, and ulna appearances from radiograph images are compared to standardized forms in one of two primary atlases (Tanner-Whitehouse and Greulich-Pyle). Ebri method (Software Program 16-Bit

(Online Program) also was used to evaluate bone age. In the second part of this project, for predicting adult height a various methods were used such as Bayle–Pinneau method, by using assisted bone age from G&P atlas, formula estimated by J.M. Tanner et al. By using assisted bone age from TW test, a mathematical model for predicting the adult height of girls with advanced puberty (online program) by using assisted bone age from G&P atlas, also adult height predicted automatically from Ebri program by using bone age also assisted by this program. In this study four methods used to assist bone age to determine advanced and delayed bone age, total 112 subjects were studied including 59 females and 53 males aged (5-17) years and the result was 41 advanced bone age,38 normal bone age, 33 delayed bone age.

Keywords: *bone age, chronological age, Tanner-Whitehouse , Greulich-Pyle, Ebri method*

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Green Synthesis of ZnO Nanoparticles Using Aloe *Barbadensis miller* (aloe vera) Leaf Extract and Its Phytochemicals

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ABSTRACT

This investigation is one of the early studies for preparation of zinc oxide (ZnO) nanoparticles from green synthesis utilizing Aloe vera leaves as reducing and stabilizing agent throughout an easy and green synthesis method. The chemical interaction of Aloe vera leaves extract with the mixture of zinc acetate, and the oxidation through galvanizing process professionally produce the reduction of zinc ions and creation of zinc oxide nanoparticles. The steadiness, cleanliness and crystalline nature of green synthesized nanoparticles were verified by means of UV-vis spectroscopy, EDAX and XRD procedures. XRD analysis revealed that Zn nanoparticles approve the hexagonal-wurtzite construction with the typical particle size of 55-60nm. The important advantages of this process are short reaction time, fast, distinct stage, environmentally friendly synthesis of ZnO nanoparticles, removal of harmful ingredients, and reproducibility of the process.

Keyword: *Nanotechnology, Nanomaterial, Green Synthesis*

ICASEE-2022

Program Flow

Period	Event		
08:00 – 09:30	Attendance Arrival and Registration		
09:30 - 10:40	Opening Ceremony Presenter: Mr. David Wafula Waswa (Hall 302) Join by Zoom	Asst. Prof. Dr. Idris Hadi, Head of Board of Trustees of TIU	
		Asst. Prof. Dr. Abdulsamad S. Ahmad, President of TIU	
		Representative of Ministry of Higher Education(MoHE)	
		ICASEE-2022 Conference Chair	
		Executive Editor of ARO Journal and EAJSE Journal	
10:40 – 11:00	Coffee Break		
11:00 – 11:40	Keynote Speech	Hall-302 Session Chair: Dr. Semih Aydin	Prof. Dr. Marwan Suleiman Mousa Title: *Using Polystyrene Nano layers as a Coating Material for Field Electron Emission*
11:40 – 12:00	Coffee Break		
12:00 – 12:40	Keynote Speech of parallel sessions	Hall- 210 Session Chair: Dr. Orhan Tug	Prof. Dr. Eberhard Malkowsky Title: Compact Operators on the Generalised Hahn Space
		Hall- 215 Session Chair: Asst. Prof. Dr. Mahmoud Dogara Abdulrahman	Prof. Dr. Rainer W. Bussmann Title: The Covid-29 pandemic - chance or detriment for ethnobiological research and international collaboration
		Hall- 214 Session Chair:Asst. Prof. Dr. Faiq H. Saeed	Prof. Dr. Andrea Pieroni Title: Kurdish ethnobotany: Quo Vadis?
		Hall- 212 Session Chair: Asst. Prof. Dr. Hassan Hassoon	Ms. Habiba Hassan Sultan Title: The Environmental Practices in UAE and Path to Sustainable Use of Energy
		Hall- 208 Session Chair: Dr. Semih Aydin	Assoc. Prof. Dr. Azeez Abdullah Barzinjy Title: Green Synthesis of Nanoparticles: From Preparation to Applications

12:40 – 14:00	Lunch Break			
14:00 – 15:00	1st Plenary Session Mathematics and Computer Sciences	Hall- 208 Session Chair: Asst. Prof. Dr. Salisu Ibrahim	Van Sirwan Abubakir	Magic Fitting Room Mirror
			Younis Sabawi	Adaptive Discontinuous Galerkin Methods For Nonlinear Parabolic Interface Problems
			Mowafaq Al-Kassab	Access To And Utilization Of Information And Communication Technology By The Teaching Staff At Tishk Tnternational University
			Wasfi Saalih Kahwachi	K-Means-Clustering And Self-Organizing Maps Comparison To Classify The Electricity Generation In Kurdistan
		Hall- 204 Session Chair: Asst. Prof. Dr. Sanhan Khasraw	Abdulnasir Isah	On Chebyshev Wavelet Polynomials Operational Matrix Of Fractional Derivatives
			Slvar Abdulazeez	A Study Of Qos In An Integrated Architecture Of Wlan And Hetnet Based Lte-A
			Salisu Ibrahim	Solution of Second-Order Differential Equation Using Least Square Method
			Yara Arjuman	Face Mask Detection System

14:00 – 15:00	1st Plenary Session Biology and Chemistry Sciences	Hall- 215 Session Chair: Mr. Harmand Ali	Saber Wasman Hamad	Bioherbicidal Actions Of Common Purslane On Seed Germination And Growth Of Some Crop And Weed Species
			Hemn Ahmad	Antifungal Impact Of Some Medicinal Plants And Natural Products On Candida Albicans And Its Biofilm Formation Capability.
			Rundk Hwaiz	Immunohistochemical Expression Of Cd56 In Papillary Thyroid Carcinoma And Its Mimics In Erbil, Kurdistan
			Mohammed Merza	Comparing The Effect Of Ramipril, Lisinopril And Enalapril On Renal Function, In Rats With Isoprenaline Induced Heart Failure
		Hall- 212 Session Chair: Ms. Sawsan Al-Rawi	Alkasim Kabiru Yunusa	Effect Of Roasting Conditions On Sensory Attributes, Polyphenolic Content And Dpph Radical Scavenging Activity Of Whole Peanut (Arachis Hypogaea)
			Zaitoon Hamad	Microbial Contamination On Used Surgical Masks Among Students During Covid -19 In Faculty Of Medicine In Koya University
			Usman Muhammad	Determination Of Heavy Metals In Dump Site At Katsina State
			Ahmad Ibrahim	Gender Evaluation, Pharmacotherapy, And Management Of Blood Cholesterol In Patients Of Duhok Province
		Hall- 209 Session Chair: Asst. Prof. Dr. Mahmoud Dogara Abdulrahman	Ahmad Kabir Maigari	Assessment Of Oxidative Stress Biomarkers In Rattus Norvegicus (Wister Rats) Experimentally Infected With Trypanosoma Brucei Brucei
			Abubakar Lema Abdullahi	Survey Of Snails In Zobe Reservoir Dustin-Ma Katsina State, Nigeria
			Shatha Jumaah	Molecular Detection Of Mutations In Brca1 Gene (Exon 11) In Iraqi Breast Cancer Patients And Their Families
			Omji Porwal	Formulation And Evaluation Of Cefotaxime Sodium Loaded Emulgel For Topical Bacterial Infections

14:00 – 15:00	1st Plenary Session Physics and Environmental Sciences	Hall-210 Session Chair: Dr. Semih Aydin	Mudhaffer Mustafa	Design Study Of The 455 Ghz, 1.027 Kw Second Harmonic Gyrotron Oscillator
			Pshdar Ahmed Ibrahim	Microstructure And Magnetic Properties Of The Alcofemnnix (X= 0, Ti, Cr, Sn, V, Hf, Ga) High Entropy Alloys
			Bestoon Mustafa	Experimental Evaluation of the Static Magnetic Field Effect on White Blood Cells: In Vivo Study
			Usman Yahaya (Online Presentation)	Response Of Parkia Biglobosa To Npk And Mycorrhiza Inoculation At Early Stage Of Plantation Establishment In Sudan Savanna Of Nigeria.
		Hall-205 Session Chair: Dr. Muhammed Hisham	Yaaqub Aziz	Tracking The Sedimentation Settings And Diagenetic Fluids Impacted On Sinjar Formation Host Rocks, Bekhme Area, Ne-Iraq
			Salem Mokhtar Tarhuni Tarhuni	Solar Energy For Traditional Houses In Erbil, Iraq
			Abdulrahman Khaleel Suliman Alassafee	Bone Age Assessment by using Different Methods
			Nabeel Fattah	Annual Background Radiation in Safeen & Hassan-Beg Mountains in Kurdistan Region/Iraq

15:00 – 15:20	Coffee Break			
15:20 – 16:20	2nd Plenary Session Mathematics and Computer Sciences	Hall- 208 Session Chair: Prof. Dr. Mowafaq Muhammed	Paree Khan Abdulla Omer	Improving Prediction Accuracy Of Lasso And Ridge Regression As An Alternative To Ls Regression To Identify Variable Selection Problems
			Wasfi Saalih Kahwach	Forecasting Electricity Generation In Kurdistan Region Using Box-Jenkins Model
			Orhan Tug	On The New Hahn Sequence Space h_d^p
			Maria Kawa	On The Spectrum Of The Matrix Operator A = (Ank) On Hahn Sequence Space h
		Hall- 204 Session Chair: Mr. David Wafula Waswa	Wasfi Saalih Kahwachi	A New Hybridization Of Bilateral And Wavelet Filters For Noisy De-Noisy Images
			Abdulnasir Isah	Appell Type Changhee Polynomials Operational Matrix Of Fractional Derivatives And Its Applications
			Younis Sabawi	Model Reduction And Implicit-Explicit Runge-Kutta Methods For Nonlinear Stiff Initial-Value Problems

15:20 – 16:20	2nd Plenary Session Biology and Chemistry Sciences	Hall- 214 Session Chair: Asst. Prof. Dr. Rundk Hwaiz	Ahmad Kabir Maigari	Evaluation Of Blatella Germanica (German Cockroach) As Carrier Of Protozoa In Kano Metropolis, Nigeria
			Tariq Abdulazeez	Assessment Of Heavy Metal Exposure In Soil Around Tannery Industry In Daura Local Government Area Katsina State, Nigeria.
			Shatha Jumaah	Pik3Ca Mutation Detection In Iraqi Breast Cancer Patients
			Amani Alsagheer	Impact Of Physical Inactivity And Pressure On Weight Gain During Covid-19 Pandemic Quarantine In Iraq
		Hall- 212 Session Chair: Asst. Prof. Dr. Mohammed Merza	Dereen Najat	Frequency Of Use Of Point Of Care Tests At Public Health Centers
			Bashdar Ismael Meena	Decorative Cosmetics And Nail Products, Toxicological Source Of Some Metals And Natural Method To Minimize It
			Sawsan Al-Rawi	Gas Chromatography Time Of Flight Mass Spectrometry A Substantial Method For Chemical Compoumnds Identification
			Harmand A. Hama	Demographic Status Of Adult Leukemia Patients In Sulaymaniyah, Kurdistan Region- Iraq
		Hall- 215 Session Chair: Dr. Saber Wasman (Online Presentation)	Hanan Tariq Subhi	Antibiotics Resistance Among Urinary Tract Infection Isolates In Koysinjaq City –Kurdistan Region –Iraq.
			Zainab Muhammad Sani	Biosorption Of Crystal Violet Dye By Aspergillus Striatus, Bacillus Megaterium, Chlorella Vulgaris And Fusarium Equiseti
			Aliyu Sulaiman	Determination Of Heavy Metals In Goat And Cow Hides Singed With Scrap Tyre In Tudun Wada Zango Abattoir, Kaduna State, Nigeria
			Chonoor Mohammadi	Reinforcing The Pepper (Capsicum Annuum) Growth By Gypsum And Salicylic Acid Under Salinity Stress
			Ibrahim Ashiru	Chemomicroscopical Examinationand Physicochemical Evaluation Of Detarium Microcarpum. (Fabaceae)
			Aliyu Sulaiman	Determination Of Heavy Metals In Soil And Some Selected Vegetables Irrigated With Waste Water Along Asikolaye Stream Kaduna, Nigeria
		Hall- 210 Session Chair: Dr. Ahmed Ibrahim	Mahmoud Dogara Abdulrahman	Chemical Composition Of Bryophyllum Pinnatum (Lam.) Oken
			Zainab Jaff	Evaluation of Knowledge, Attitudes, and Practices regarding post COVID 19 complications (Physical, Biological), and Immunization Practices in Hawler Medical University, KR, Iraq
			Shokhan Hidayat Hamarashid	Coated Meat With Bioactive Edible Films

15:20 – 16:20	2nd Plenary Session Physics and Environmental Sciences	Hall-207 Session Chair: Dr. Nasih Hawramy	Abdulrahman Khaleel Suliman Alassafee	Seasonal Variation Of Uv In Erbil City
			Pshdar Ahmed Ibrahim	A Literature Review of Publications Trends to Shape Memory Alloys by using Bibliometric Analysis
			Payam Najmadden	Quartz Crystal Microbalance A Powerful Technique For Nanogram Mass Sensing
		Hall-205 Session Chair: Asst. Prof. Dr. Asaad Ismail	Semih Aydin	Green synthesis of ZnO Nanoparticles using Aloe barbadensis miller (aloe vera) leaf extract and its Phytochemicals
			Diyar Sadiq	Surface Plasmon Resonance for Detection of Biological Species
			Rayan Fatah	The Stratigraphy And Depositional Setting Of The Khurmala Formation, Ne-Iraq
16:20 – 16:30	Coffee Break			
16:30 – 17:00	Closing Ceremony			

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